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PSYCHOLOGICAL IMPACT ON PRIMARY HYPOTHYROIDISM: GENDER DIFFERENCES IN ANXIETY, DEPRESSION AND STRESS

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ABSTRACT

The study was conducted in the year 2024 to emphasis on prevalence of anxiety, depression and stress in hypothyroidism patients. The study included a convenient sample of 100 hypothyroid patients aged between 20-60 years, encompassing both male and female participants. The results conferred that with respect to Body Mass Index (BMI), majority (46.87%) of the female respondents were fell under overweight category, whereas, 38.88 per cent of male respondents were found under pre-obese category. Whereas, in case of anxiety among hypothyroid subjects, both the gender reported similar feelings in-terms of numbness (62.00%) and heartbeat (46.00%). In case of depression, 71 per cent of females expressed that they had lost interest in everything, whereas 61 per cent of the male felt sad. With regard to stress, 75 per cent of females expressed that they couldnot tolerate the interruptions during working time. In case of males, majority of them (66.00%) expressed that stress full events cause problem in relationship with other people.

Keywords: Hypothyroidism, Anxiety, Depression, Stress

INRODUCTION

Hypothyroidism is a significant health issue, with prevalence rates around 4-5% in developed countries and 4-15% for subclinical hypothyroidism (Mark and Vanderpump, 2011). Hypothyroidism is more common in women and often has a genetic component. Symptoms include fatigue, depression, cold sensitivity, weight gain, dry skin, hair changes, constipation, and irregular menstrual cycles (Chaker *et al.*, 2017). These symptoms, particularly weight gain and hair loss, can increase depression risk, with obese individuals more probable to experience depressive symptoms

Other factors *viz.,* age, disease duration, and medication adherence also impact depression levels in hypothyroidism patients (Alghasham *et al*., 2021). Subclinical hypothyroidism can lead to anxiety, irritability, poor concentration, and cognitive issues. Anxiety affects around 25% of the population (Malathylyer, 2013) and depression significantly impacts quality of life and is a major global disease burden.

Anthropometric measurements such as height, weight, and BMI are recorded to assess obesity as a potential factor contributing to psychiatric issues. Obesity is linked to various mental health conditions, including anxiety,

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depression, and stress. By incorporating these measurements into the assessment, healthcare specialists can better comprehend the relationship among obesity and psychiatric issues in individuals with hypothyroidism. Hence, the present study aims to identify the prevalence of anxiety, depression, and stress in hypothyroidism patients.

MATERIAL AND METHODS

A cross-sectional study conducted in Visakhapatnam aimed to estimate the prevalence of anxiety, depression, and stress among hypothyroidism patients. The study included a convenient sample of 100 hypothyroid patients aged between 20-60 years, encompassing both male and female participants. Exclusions from the study criteria comprised pregnant women, ICU cases, cancer patients, individuals with chronic diseases, postpartum mothers, and subjects undergoing psychiatric treatment.

In the study, a structured questionnaire was administered to gather data, and personal interviews were conducted with subjects to assess symptoms related to anxiety, depression and stress. The data collected included socio-economic characteristics such as age, sex, marital status, educational background, and occupational status. Additionally, the biochemical history of thyroid-stimulating hormone (TSH), triiodothyronine (T3), and thyroxine (T4) levels was also recorded for each participant.

In this case, a checklist of questions related to anxiety (19), depression (15), and stress (14) was provided to the subjects. The subjects were asked these questions, and their reactions and responses were recorded for necessary analysis. This method can help in identifying potential mental health issues that may be associated with hypothyroidism. The symptoms and complications of hypothyroidism had been assessed through a questionnaire. The data was analyzed using percentage, mean, and standard deviation.

Stress exacerbates physical and mental health issues, including heart disease, cancer, and depression. The Anxiety Depression Stress Scale, developed by Singh and Bhatnagar (2016), provides an objective tool for assessing these conditions, using criteria from the ICD and DSM.

RESULTS AND DISCUSSION

The present study is an observational one that utilized convenient sampling of 100 hypothyroidism subjects. Numerous parameters were taken into consideration, including, Socioeconomic characteristics of hypothyroidism subjects, anthropometric measurements of hypothyroidism subjects, biochemical parameters of hypothyroidism subject, symptoms of hypothyroidism subjects, anxiety, depression, and stress rating scales

Age Distribution: The majority (44.00%) of the participants, are aged between 20-30 years, including 30 females and 14 males followed by the 30-40 age group, representing 26 per cent of the sample, comprising 16 females and 10 males. Those aged 40-50 years account for 20 per cent of the sample, with 12 females and 8 males, while only 10 per cent are aged 50-60 years, including 6 females and 4 males.

Residence: The majority, 77 per cent of the population, resides in rural areas, with 47 females and 30 males. The remaining 23 per cent live in urban areas, consisting of 13 females and 10 males.

Education Level: A small portion, 12 per cent of the participants, have no formal education, equally distributed between 6 females and 6 males. Those educated below the 10th standard represent 22 per cent of the sample, including 10 females and 12 males. The 10th standard has been completed by 10

Table 1: Demographic Characteristics of Hypothyroidism Population

Profile	Category	Percentage (%)	Patients n=100	Frequency Female (n=64)	Frequency Male (n=36)
Age in years	20-30	44	44	30	14
	30-40	26	26	16	10
	40-50	20	20	12	8
	50-60	10	10	6	4
Residence	Rural	77	77	47	30
	Urban	23	23	13	10
Educational	No formal education	12	12	6	6
status	<10th standard	22	22	10	12
	10th standard	10	10	6	4
	Intermediate	20	20	18	2
	Degree	28	28	20	8
	PG	8	8	4	4
Occupation	Government job	-	-	-	-
	Private job	26	26	6	20
	House wife	24	24	24	0
	Others	50	50	32	18
Income (Rs)	10000-20000	45	45	25	20
	20000-30000	43	43	26	17
	30000-40000	12	12	4	8
Marital Status	Married	86	86	32	54
	Unmarried	12	12	10	2
	Widow	2	2	2	0

The study involved a total of 100 individuals, comprising 64 females and 36 males.

per cent of participants, comprising 6 females and 4 males. Intermediate education is attained by 20 per cent, with 18 females and 2 males. Degree holders form 28 per cent of the sample, including 20 females and 8 males, while 8 per cent have a postgraduate degree, evenly split between 4 females and 4 males.

Occupation: Private jobs are held by 26 per cent of the population, with 6 females and 20 males. No participants were reported in government jobs. Housewives represent 24 per cent of the sample, all being female. Those engaged in other occupations account for 50 per cent, including 32 females and 18 males.

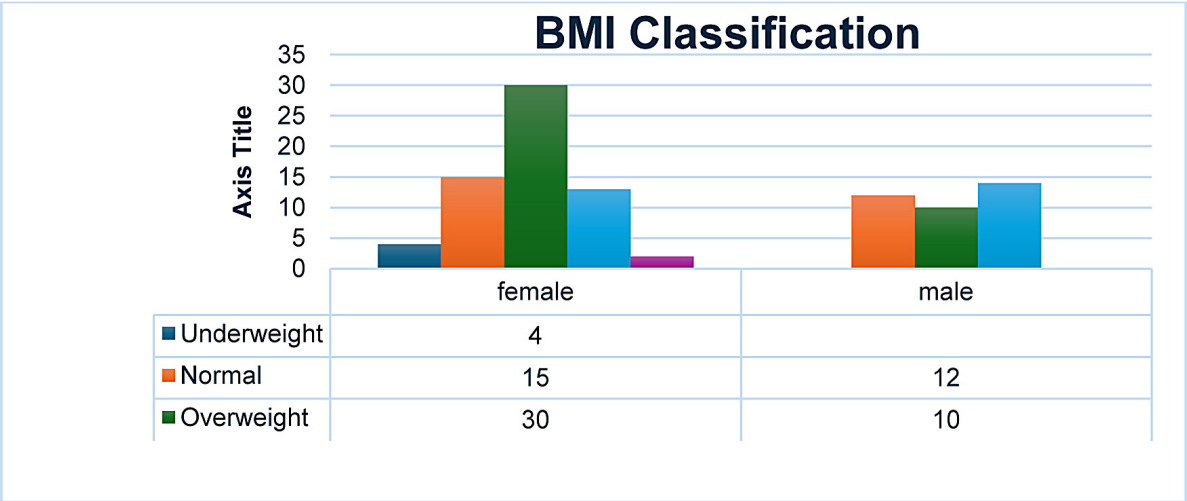


Fig 1: BMI classification of Hypothyroid subjects

Income: Regarding income, 45 per cent of participants earn between Rs 10,000-20,000, comprising 25 females and 20 males. Those earning Rs 20,000-30,000 represent 43 per cent of the sample, including 26 females and 17 males. Only 12 per cent earn between Rs 30,000-40,000, with 4 females and 8 males.

Marital Status: Most participants, 86 per cent, are married, including 32 females and 54 males. Unmarried individuals constitute 12 per cent, with 10 females and 2 males, while widows make up 2 per cent, all being female.

From the above fig 1 the BMI classification data shows a detailed distribution of individuals across different BMI categories for both females and males. Among females, 4 are classified as underweight (BMI < 18.5), 15 have a normal BMI (18.5-22.9), 30 are overweight (BMI 23-24.9), 13 fell into the pre-Obese category (BMI 25-29.9), and 2 are in the pre-Obese category (BMI > 30). For males, 2 are underweight, 12 have a normal BMI, 10 are overweight, 14 are classified as pre-Obese, and none are in the pre-Obese category. The largest group among females is the overweight category, while the largest group among males is the pre-Obese category, indicating a significant difference in the distribution of BMI classifications between genders. In studies, it has been observed that overweight and obesity are more prevalent among females than males, especially in the overweight category. This difference may be influenced by variations in lifestyle, dietary choices, or genetic factors.

A study conducted by Ogden *et al.* (2006) found higher rates of overweight and

Table 2. Biochemical Parameters with Mean and SD of Hypothyroid subjects

Biochemical tests	Normal Values	Female		Male	
		Mean	SD	Mean	SD
T3	**0.6-2.0ng/ml**	1.307	1.588	1.028	0.309
T4	**4-12mg/dl**	9.246	2.158	1.028	2.254
TSH	**0.5-5.5mIU/ml**	4.289	4.345	5.702	10.51
Haemoglobin	**12.0-16.0**	10.438	1.257	11.231	1.155

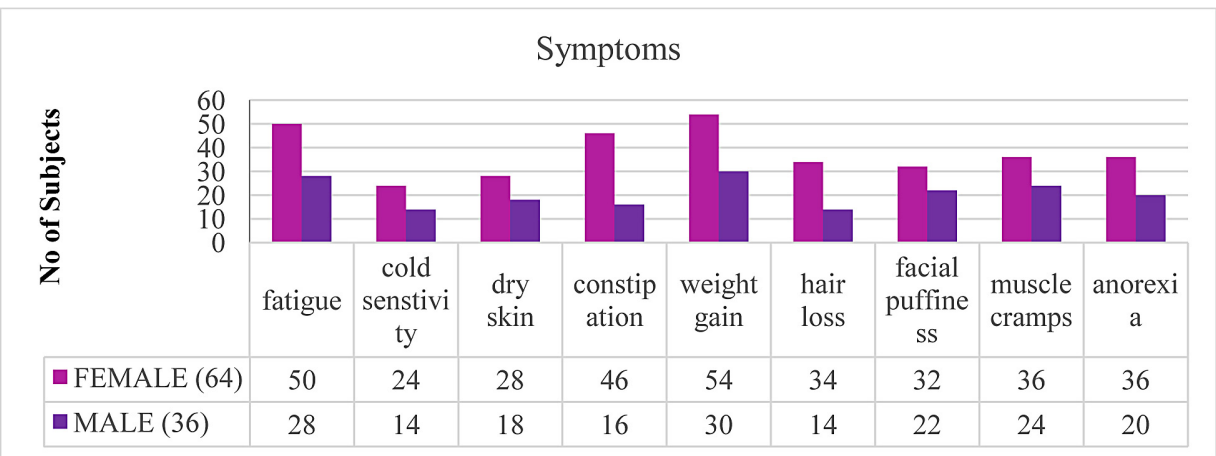
obesity among women in the United States, emphasizing the importance of gender-specific interventions.

The table 2 provides a comparison of mean and standard deviation (SD) values for T3, T4, TSH, and hemoglobin levels between female and male subjects, along with their corresponding normal ranges. For T3 levels, the mean for females was 1.307 ng/ml with an SD of 1.588, whereas for males, it was 1.028 ng/ml with an SD of 0.309. Similarly, for T4 levels, females had a mean of 9.246 mg/dl with an SD of 2.158, while males had a mean of 1.028 mg/dl with an SD of 2.254. TSH levels in females had a mean of 4.289 mIU/ml with an SD of 4.345, while in males, it was 5.702 mIU/ml with an SD of 10.51. Finally, hemoglobin levels in females had a mean of 10.438 with an SD of 1.257, whereas in males, it was 11.231 with an SD of 1.155.

Moron-Diaz *et al.,* 2021 conducted a study to investigate how TSH levels are related to health-related quality of life. It focused on individuals with hypothyroidism who were adequately treated for their condition. Using the ThyPRO-39 questionnaire, they assessed HRQL in 218 patients with primary hypothyroidism from a single endocrinology department. The research discovered that higher TSH levels were associated with a decline in HRQL. Additionally, TSH levels were found to be connected to assessments of tiredness and emotional sensitivity

The data from Figure 2 shows the prevalence of various symptoms among the total participants, broken down by gender. In terms of fatigue, 78 per cent of the total participants reported experiencing it, with 50 per cent being females and 28 per cent being males. Cold sensitivity was reported by 38 per cent of the participants, with 24 per cent being females and 14 per cent being males. Dry skin was reported by 46 per cent of the total participants, with 28 per cent being females and 18 per cent being males. Constipation was reported by 62 per cent of the total participants, with 46 per cent being females and 16 per cent being males.

Weight gain was reported by 84 per cent of the total participants, with 54 per cent being females and 30 per cent being males. Hair loss was reported by 48 per cent of the total participants, with 34 per cent being females and 14 per cent being males. Facial puffiness was reported by 54 per cent of the participants, with 32 per cent being females and 22 per cent being males. Muscle cramps were reported by 60 per cent of the total participants, with 36 per cent being females and 24 per cent being males. Anorexia was reported by 56 per cent



	fatigue	cold senstivity	dry skin	constipation	weight gain	hair loss	facial puffiness	muscle cramps	anorexia
FEMALE (64)	50	24	28	46	54	34	32	36	36
MALE (36)	28	14	18	16	30	14	22	24	20

Fig 2. Clinical Symptoms of Hypothyroid subjects

Table 3. Anxiety among Hypothyroid subjects

S.No	Anxiety Scale	Total (100)	Female N=64 (%)	Male N=36(%)
1	Are you feeling difficulty while breathing.	28	18(28)	10(27)
2	Are you feeling more nervous and anxious than usual.	40	26(40)	14(38)
3	Do you feel pressure in chest.	40	28(43)	12(33)
4	Do you feel weak and tired.	64	44(68)	20(55)
5	Do you feel your heartbeat faster.	48	30(46)	18(50)
6	Do you feel scare for small reasons.	56	34(53)	22(61)
7	Do you feel faintness.	30	18(28)	12(33)
8	Do you have a feeling like numbness.	62	40(62)	22(61)
9	Do you have headache, neck and back pain.	48	32(50)	16(44)
10	Do you have any blurred vision.	50	32(50)	18(50)
11	Do you have aware of the dryness of mouth.	86	54(84)	32(88)
12	Will perspire heavily even in absence of physical exertion and high temperature (Eg:- hands sweaty)	60	34(53)	26(72)
13	Do you feel panic and male of fool of you self.	64	44(68)	20(55)
14	Have you felt empty your bladder often.	62	42(65)	20(55)
15	Often do you have feeling of nausea.	64	46(71)	18(50)
16	Do you have nightmares.	36	24(37)	12(33)
17	Are you feeling bothered by stomach and indigestion.	44	30(46)	14(38)
18	Difficulty in swallowing.	36	20(31)	16(44)
19	Get scared without good reason	56	30(46)	26(72)

of the total participants, with 36 per cent being females and 20 per cent being males.

Lang *et al.,* 2020 conducted a cross-sectional study with 1,706 Chinese patients diagnosed with major depressive disorder and found that severe subclinical hypothyroidism was associated with an increased risk of suicide attempts and psychiatric symptoms. The study also identified links between elevated thyroid-stimulating hormone levels, severe anxiety, depressive and psychotic symptoms, increasing age, and higher body mass index.

In Table 3, females reported higher percentages in several symptoms: 43 per cent of them expressed feeling pressure in the chest followed by feeling weak and tired (68.00%), numbness and tingling in fingers and toes (53.00%), dryness of mouth (84.00%), heavy perspiration without physical exertion (53.00%), panic and feeling like a fool (68.00%), frequent bladder emptying (65.00%), feeling nauseous often (71.00%), and getting scared without a good reason (46.00%).

On the other hand, 27 per cent of males reported higher percentages in feeling difficulty while breathing followed by feeling more nervous and anxious than usual (38.00%), feeling faint (33.00%), having blurred vision (50.00%), having nightmares (33.00%), feeling

Table 4. Depression among Hypothyroid subjects

S.No	Depression Scale	Total (100)	Female N=64 (%)	Male N=36(%)
1	Do you want to be alone.	56	38(59)	18(50)
2	Do you feel sad and depressed.	58	36(56)	22(61)
3	Feel that your life is meaningless.	60	40(62)	20(55)
4	Can you handle or control your feelings.	50	30(46)	20(55)
5	Do you have any expectations or hope for your future.	38	26(40)	12(33)
6	Often feel have nothing to look forward	66	40(62)	26(72)
7	Are you losing interest in everything.	66	46(71)	20(55)
8	Difficulty in taking initiatives for new tasks	54	36(56)	18(50
9	Not able to feel good.	60	40(62)	20(55)
10	Not able to do anything.	28	18(28)	10(27)
11	Down hearted and sad.	52	36(56)	16(44)
12	Not able to be enthusiastic about anything.	50	30(46)	20(55)
13	Do you feel unwell.	62	40(62)	22(61)
14	Do you feel not worth as a person.	42	22(34)	20(55)
15	I often have crying bouts without good reasons	46	30(46)	16(44)

bothered by stomach and indigestion (38.00%), and experiencing difficulty in swallowing (44.00%). Both genders reported similar percentages in feeling their heartbeat (46.00%) and having a feeling of numbness in hands and legs (62.00%).

The study by Baxter *et al.* (2013) sheds light on the gender differences in anxiety reporting. While females tend to report higher anxiety levels, it's essential to recognize that males are not exempt from feeling anxiety. Interestingly, males may manifest anxiety through distinct symptoms compared to females. This underscores the importance of considering gender-specific approaches when addressing mental health concerns.

The depression scale results indicated that a significant percentage of both females and males reported various symptoms.

In Table 4, females reported higher percentages in several areas: 59 per cent of them wanting to be alone followed by feeling that life is meaningless (62.00%), having nothing to look forward to (62.00%), losing interest in everything (71.00%), not feeling good (62.00%), feeling unwell (62.00%), and having crying bouts without good reasons (46.00%).

On the other hand, majority of males (61.00%) reported higher percentages in feeling sad and depressed followed by having difficulty in handling or controlling feelings (55.00%), lacking expectations or hope for the future (33.00%), being unable to do anything (27.00%), feeling downhearted and sad (44.00%), not feeling worth as a person (55.00%), and not being enthusiastic about anything (55.00%). Both genders (56.00%) reported similar percentages in difficulty taking initiatives for new tasks.

In a study conducted in 2017 by Tayde *et al.,* 2017 involving 33 participants,

Table 5. Stress among Hypothyroid subjects

S.No	Stress Scale	Total (100)	Female N=64 (%)	Male N=36(%)
1	Do you have any difficulty in concentration.	52	34(53)	16(44)
2	Does your mind go blank.	38	28(43)	6(16)
3	Stressful events cause problem in my relationship with people	64	40(62)	24(66)
4	Feel that, you are more irritable.	44	32(50)	12(33)
5	Do you find, that it is difficult to relax.	56	34(53)	22(61)
6	Do you get upset easily.	36	26(40)	10(27)
7	Do you feel restless.	56	42(65)	14(38)
8	Are you slow to respond.	48	34(53)	14(38)
9	Unwanted memories of mind.	48	26(40)	22(61)
10	Do you feel stress to attend events.	52	40(62)	12(33)
11	Do you feel agitated in everything.	28	12(18)	16(44)
12	Are you tolerating any interruption in between your work.	60	48(75)	12(33)
13	Do you feel hard to calm down after getting upset.	48	36(56)	12(33)
14	Do you feel that, you are touchy.	50	32(50)	18(50)

researchers used the Montgomery-Åsberg Depression Rating Scale and found that half of the participants experienced mild to moderate depression. A study conducted in the clinics of King Fahd Hospital of the University revealed different levels of depression among hypothyroidism patients: no depression in a quarter of the study population, mild depression in 38 per cent, moderate depression in 10 per cent, moderately severe depression in 20 per cent, and severe depression in 3.6 per cent of patients.

The stress scale results showed that both females and males reported various symptoms related to stress.

It was inferred from Table 5, that 53 per cent females reported higher percentages in experiencing difficulty in concentration followed by finding it difficult to relax (53.00%), feeling restless (65.00%), being slow to respond (53.00%), having unwanted memories in mind (40.00%), feeling stressed to attend events (62.00%), tolerating interruptions in work (75.00%), finding it hard to calm down after getting upset (56.00%), and feeling touchy (53.00%).

On the other hand, 43 per cent of males reported higher percentages in their minds going blank followed by feeling more irritable (50.00%), getting upset easily (40.00%), feeling agitated in everything (44.00%), and having difficulty in calming down after getting upset (50.00%). Both genders (62.00%) reported similar percentages in stressful events causing problems in relationships with people.

Table 6 presents data in terms of anxiety levels, females exhibited a higher mean score of 9.78 with a standard deviation of 1.52, while males had a comparatively lower mean score of 5.56 with a standard deviation of 1.30. The mean depression score for females was 7.94 with a standard deviation of 0.86, while for

Table 6. Mean and Standard Deviation of Anxiety, Depression and Stress Scale

Anxiety		Female	Male
	Mean	9.781	5.555
	Standard Deviation	1.515	1.300
Depression	Mean	7.937	7.77
	Standard Deviation	0.863	2.069
Stress	Mean	7.25	7.38
	Standard Deviation	1.145	0.950

males, it was slightly lower at 7.78 with a higher standard deviation of 2.07. For stress levels, females had a mean score of 7.25 with a standard deviation of 1.15, whereas males had a slightly higher mean score of 7.39 with a lower standard deviation of 0.95.

Females exhibited a higher mean score of 9.78 with a standard deviation of 1.52 in terms of anxiety whereas the mean score of 7.94 with a standard deviation of 0.86 was observed in case of depression when compared with males. In case of stress, males had a slightly higher mean score of 7.39 with a lower standard deviation of 0.95.

Table 7 presents data on the anxiety, depression, and stress levels, measured by z-scores, for both females and males. The findings indicate that a small number of respondents reported significantly elevated levels of anxiety, with 2 females and 2 males falling into the “High” category, while 4 males showed “High” levels of depression. When it comes to stress, no respondents were reported at “High” levels. A moderate number of respondents exhibited “Above Average” levels, with 3 females and 2 males reporting slightly elevated anxiety, and 12 females and 6 males showing above-average stress levels. The majority of respondents fell within the “Average” range, with 32 females and 34 males reporting average levels of anxiety, 44 females and 3 males for depression, and 52 females and 3 males for stress. This endorses that most respondents experienced typical levels of anxiety, depression, and stress.

CONCLUSIONS

Based on the findings, out of the respondents, females exhibited a higher mean score of 9.78 with a standard deviation of 1.52 in terms of anxiety whereas the mean score of

Table 7. Levels of Anxiety, Depression and Stress in Hypothyroid subjects

	Anxiety		Depression		Stress		
Levels	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Z Score**
Extremely High	-	-	-	-	-	-	+2.01 & above
High	2	-	-	2	-	-	+1.26 to +2.00
Above Average	3	-	2	4	12	6	+0.51 to +1.25
Average	32	34	44	3	52	3	-0.50 to +0.50
Below Average	-	2	-	-	-	-	-1.25 to -0.51
Low	-	-	-	-	-	-	-2.00 to -1.26
Extremely Low	-	-	-	-	-	-	-2.01 & above

7.94 with a standard deviation of 0.86 was observed in case of depression when compared with males. In case of stress, males had a slightly higher mean score of 7.39 with a lower standard deviation of 0.95. Overall, the data assessed that most respondents experience average levels of anxiety, depression, and stress, with only a few reporting significantly elevated levels. There were notable differences between females and males in the distribution of responses, particularly for depression, where more females were in the higher categories compared to males.

REFERENCES

Alghasham KZ, Alghasham GZ, Alkulaib NS, and Elshebiny AM. 2021. Prevalence of depression among patients with primary hypothyroidism in the Eastern Region of Saudi Arabia: does obesity matter?. International Journal of Medicine in Developing Countries. 5(4): 1060-1065. doi:10.24911/IJMDC.51-1613629571

Baxter AJ, Scott KM, Vos T, and Whiteford HA. 2013. Global prevalence of anxiety disorders: asystematic review and meta-regression. *Psychological Medicine*. 2013;43(5):897-910. dzdoi:10.1017/S003329171200147X

Chaker L, Bianco AC, Jonklaas J, Peeters RP. and Hypothyroidism. 2017. doi: 10.1016/S0140-6736(17)30703-1. Lancet.390 (10101):1550-1562.

Lang X, Hou X, Shangguan F, and Zhang XY 2020. Prevalence and clinical correlates of subclinical hypothyroidism in first-episode drug-naive patients with major depressive disorder in a large sample of Chinese. J Affect Disord. 2020 15 (263) :507-515. doi: 10.1016/j.jad. 2019.11.004. Epub 2019 Nov 3. PMID: 31759671.

Mark., P. J. and Vanderpump. 2011. The epidemiology of thyroid disease. British Medical Bulletin, 99(1), 39-51.

Malathylyer. 2013. One of every four Indians affected by anxiety disorders, 10% are depressed. October 6. The Times of India.

Moron-Diaz M, Saavedra P, Alberiche-Ruano, M.P., Rodríguez-Perez, C.A., Lopez-Plasencia, Y., Marrero-Arencibia, D., González-Lleo, A.M., and Boronat, M. 2021.Correlation between TSH levels and quality of life among subjects with well-controlled primary hypothyroidism. Endocrine. 72(1):190-197. doi: 10.1007/s12020-020-02449-4. Epub 2020 Sep 8. PMID: 32897515.

Ogden, C.L., Carroll, M.D., Curtin, L.R., McDowell, M.A., Tabak, C.J., and Flegal, K.M. 2006. Prevalence of overweight and obesity in the United States, 1999-2004. JAMA.295(13):1549-55. doi: 10.1001/jama.295.13.1549. PMID: 16595758.

Singh, M and Bhatnagar, P. 2016. Anxiety Depression Stress Scale (ADSS): A Factor Analytic Study.The International Journal of Indian Psychology 3(2):2349-3429

Tayde, Parimal S., Bhagwat Nikhil M., Sharma Pragya., Sharma, Bharat.,Dalwadi Pradip P.,Sonawane, Ashutosh., Subramanyam, Alka., Chadha, Manoj.,Varthakavi and Premlata K. 2017. Hypothyroidism and Depression: Are Cytokines the Link?. Indian Journal of Endocrinology and Metabolism 21(6): 886-892. | DOI: 10.4103/ijem.IJEM_265_17

Vadarevu, S and Balasasirekha, R. 2025. Psychological impact onprimary hypothyroidism: Gender differences in anxiety, depression andstress. ANGRAU, 53(1), 86–95.