Panacea Journal of Medical Sciences 2023;13(2):269–276

Content available at: https://www.ipinnovative.com/open-access-journals

Panacea Journal of Medical Sciences

Journal homepage: http://www.pjms.in/

Original Research Article

A study on the relationship between stress-associated lifestyles disorders and essential preventive therapy among women entrepreneurs

Pallab Bera[1], Swapan Banerjee[2,*]

[1] *Dept. of Biochemistry, Midnapore Medical College and Hospital, Vidyasagar Road, Midnapore, West Bengal, India*
[2] *Dept. of Nutrition, Seacom Skills University, Kendradangal, Birbhum, West Bengal, India*

ARTICLE INFO

Article history:
Received 10-02-2022
Accepted 15-04-2022
Available online 31-07-2023

Keywords:
Stress
Metabolic disorders
Hormonal imbalances
Lifestyleschanging therapy
Diet practice
Women entrepreneurs lifestyles

ABSTRACT

Stress is one of the critical factors nowadays affecting almost all people globally. Our study aims to find the association between stress among women entrepreneurs and their metabolic health issues caused by various hormonal imbalances. The study correlated with major female health issues such as polycystic ovarian syndrome, obesity, hyperprolactinemia, infertility, bone health, and trending lifestyle-changing interventions: diet, homeopathic, hormonal treatments, etc. A total of 60 women participants within the age group from 30 to 45 years were included in the study at Kolkata and surrounding areas considering participants' hectic lifestyles, food and exercise habits, medicines, etc. The semi-structured online survey was done through email using the particular questionnaire based on biochemical test reports, seven-day diet and activities records, and medicine consumption cum hormonal intake irrespective of the participant. Pearson Chi-square test, Likelihood Ratio, Symmetric Measures applied for statistical analysis using SPSS-22. The results showed that the two types of stress were found in 30 participants in each category with asymptotic significance (2-sided) .392 and .403, respectively, while Chi-square significance is approximately .05. So, there is no statistical significance between the relationship of participants' age, all types of concerning diseases, and practicing therapies. The study found that many participants were not following diet despite knowledge of health benefits. The study concluded that stress can be directly or indirectly related to metabolic syndrome but not always cause hormonal imbalances. However, the participants should go with a proper diet and exercise rather than practicing a fad diet or so-called crash diets.

1. Introduction

Stress is one of the factors that affect millions of people globally. Working people, mainly women, are more under stress due to work, family, and children's education pressure. Therefore, many researchers discuss the correlation between anxiety and other metabolic disorders among working women.

1.1. Polycystic ovarian syndrome

Polycystic ovarian syndrome (PCOS), hypothyroidism or other thyroid disorders, diabetes, alteration of body compositions due to obesity are the most expected outcomes in a stressful life.[1] Further, obesity is commonly observed among PCOS or polycystic ovarian disease (PCOD) patients. The study shows that all stages of obesity and fat distributions take significant roles in the cause of PCOS.[2] Salivary-amylase and cortisol have been found as sensitive biomarkers for stress-related alterations in the body, both of which play a critical role in metabolic balance. The

* *Corresponding author*.
E-mail address: sbanerjee.researcher.21@gmail.com (S. Banerjee).

https://doi.org/10.18231/j.pjms.2023.053

sympathetic-adrenal medullary and hypothalamic-pituitary-adrenal axes are both activated in these situations.[3]

1.2. Hyperprolactinemia

The release of prolactin as a stress response component is critical emphasis since there is evidence that prolactin plays a role in developing stress-induced pathologies, including stress-induced intestinal epithelial barrier dysfunction.[4]Hyperprolactinemia increases adrenocorticotropic hormone (ACTH) secretion and may directly stimulate adrenal steroidogenesis that plays a vital role in the adrenal gland's response to stress.[5]

1.3. Obesity

In people with higher glucocorticoid exposure or sensitivity, stress may have a substantial role in developing and maintaining obesity. These insights could lead to more tailored and effective obesity treatment options. Stress has long been linked to central obesity, particularly visceral and subcutaneous fat problems. Overall, stress, both physical and psychological, is an inevitable aspect of life for everyone.[6]

1.4. Mechanism of stress

Acute stress is more common in one group of people. Catecholamines epinephrine and norepinephrine (catecholamines in defense mechanism response) are sourced in the sympathetic nervous system and the adrenal medulla within seconds after stress stimulation. Vasoconstriction of blood arteries is induced by them that affect the skin and the intestines. So, stress accelerates heart rate, enzymatic malfunctions, and stroke volume. Furthermore, adrenaline accelerates glycogenolysis in the liver extends serum glucose levels, producing a protective response.[7] The lengthy response affects the mode of stress by affecting molecules, including norepinephrine, cortisol, and corticotrophin-releasing hormone (CRH). These hormones can lead to various disorders, including metabolic, inflammatory, and neuropsychiatric issues.

1.5. Bone health

There is little evidence of a direct link between osteoporosis and chronic physical or psychological stress. Some studies reviewed and suggested that a multi-factorial assessment should be considered for improving patient outcomes in populations experiencing psychological stress, particularly those at high risk for osteoporosis. Psychological stress can have a long-term impact on the likelihood of simultaneous illness development and pre-existing disorders. Obesity, atherosclerosis, lung diseases, and diabetes have been linked to chronic stress. Psychological stress can have a long-term impact on the likelihood of comorbid illness development and pre-existing disorders. In short, obesity, atherosclerosis, lung diseases, and diabetes have been linked to chronic stress.[8]

Obese women with PCOD, infertility and other hormonal issues usually practice a poor diet that lacks fiber, whole grains, and iron. Therefore, eating behaviors should be changed to achieve proper weight and metabolic health. However, modern medicines are always the best choice for the typical and critical patients apart from diet and other alternative interventions.[9]

2. Materials and Methods

The study was based on a semi-structured online survey conducted among 60 women entrepreneurs running their business at Kolkata and surrounding areas considering an individual participant's hectic lifestyles, including food and exercise habits, medicines, etc. The women participants were within the age group from 30 to 45 years suffering from various lifestyle disorders such as obesity, polycystic ovarian syndrome (PCOS), infertility, hyperprolactinemia, low bone mass, etc. All the participants provided through emails 'informed consent' form duly filled and signed. The study mainly tried to find the association between stress among the participants due to busy lifestyles and mentioned health issues. Further, the common interventions for lifestyle modifications and infertility treatments, diet, homeopathic, modern medicines, and hormonal protocols were considered the best preventive approach to recover gradually. The semi-structured survey was done through email based on particular questionnaires to each participant.[10] The respective diagnostics and biochemical test reports, seven-day diet and activities records, and medicine consumption cum hormonal intakes were also collected as secondary data for health issues analysis of each participant for the year Jan-Dec 2019. Pearson Chi-square test, Likelihood Ratio, Symmetric Measures applied for statistical analysis. Women with diabetes and transferable jobs were not included in the study.

3. Results

In the study, 60 participants were assessed by the two statuses of stress, high and medium irrespective of their lifestyles changing practices: diet, homeopathic, hormonal, and nothing (no) interventions. The two types of stress were found in 30 participants, each with asymptotic significance (2-sided) .392 and .403, respectively, while chi-square significance is approximately .05 (Tables 1, 3, 6, 9 and 12). So, there is no statistical significance between the relationship of participants' age and practicing therapies, even in the case of Likelihood Ratio (.928 and. 930) (Tables 2, 4, 7 and 13). Chi-Square tests can be used for testing the null hypothesis when the

'significant value' must be .05 or less. In SPSS, we analyzed all the dependent variables irrespective of the participants' stress. The diseases were divided into 3 categories (8 diseases), and interventions (3 ways of lifestyles changing, 1 way was 'no') were found non-significant in every table. Similarly, Symmetric Measures were also found non-significant because it signifies the magnitude of the association between stress and other variables in the study. Phi, Cramer's V, and Contingency Coefficient were observed as greater than .05. The study showed the number of participants who followed the therapy practices categorically. Table 5 showed that 12 PCOD, 5 hyperprolactinemia high-stressed participants, and 8 PCOS medium-stressed were found to practice the diet. 4 homeopathic, 6 hormonal patterns were there, and 21 participants found no diet or other interventions. Similarly, Table 8 demonstrated 25 participants as obese (both types), and 21 were not following any interventions despite being obese. The results also showed that 23 high-stressed participants suffering from low-bone mass were under various therapies. Out of 30 in this category, 15 followed the diet and 3 from osteoarthritis only as per Table 11. Similarly, 21 participants did not follow the diet in the medium stress category, but only 7 women were practicing.

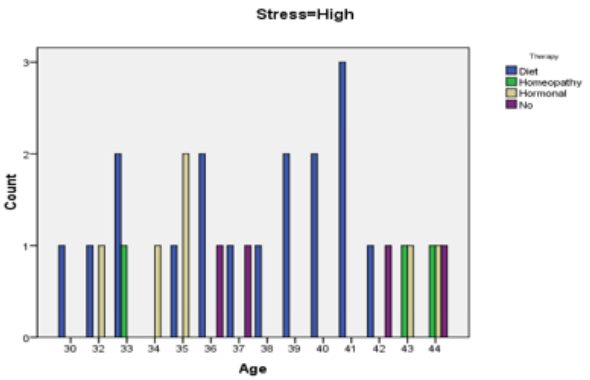

Fig. 1: Age-wise high-stressed patients' therapy

The graphs visible above and below, starting from Figures 1, 2, 3, 4, 5, 6, 7 and 8, are concerned about the graphical presentation of frequency, irrespective of age, 3 categories of diseases, while each type concerning specific health issues. The therapies such as diet, homeopathy, hormonal protocol, and 'no' practices were shown one by one based on the statistical analysis of Chi-Square, Likelihood Ratio, and Symmetric Measures. Therefore, all the graphs depicted the frequencies (count) vs. various diseases to assess the therapy follow-up or 'no' follow-up from the participants' end.

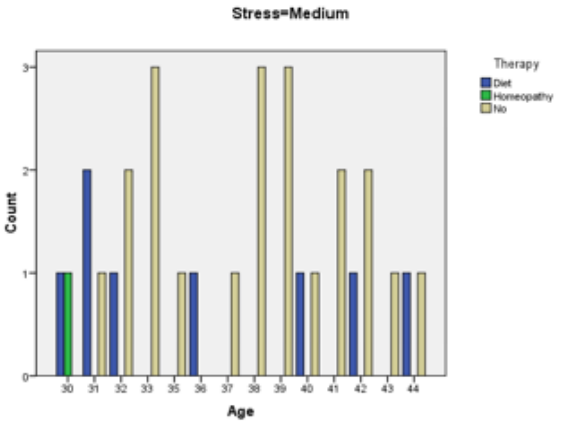

Fig. 2: Age-wise medium-stressed patients' therapy

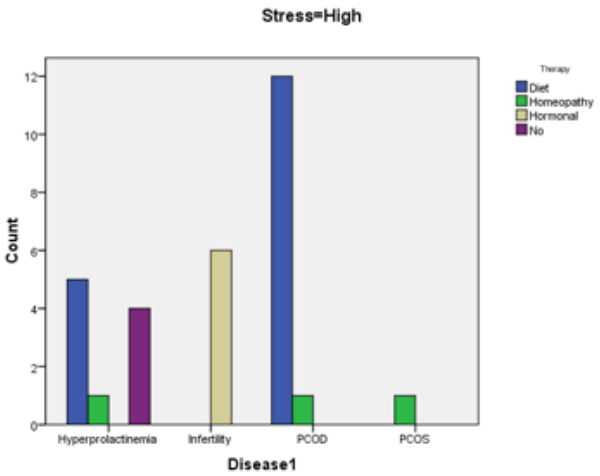

Fig. 3: Disease (1) wise high-stressed patients therapy

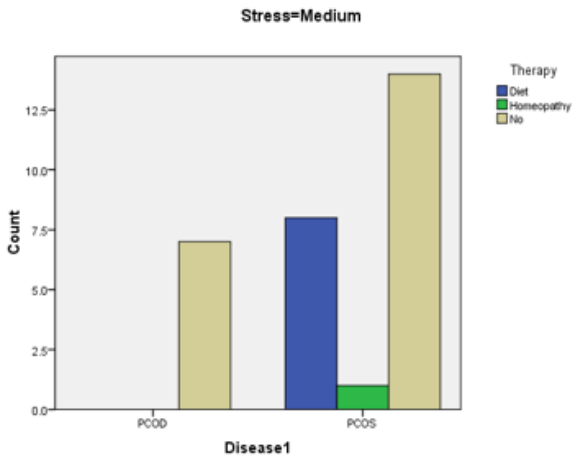

Fig. 4: Disease (1) wise medium-stressed patients' therapy

Table 1: Chi-Square vs. Likelihood ratio to find association within-subjects stress and various therapies

Stress		Value	df	Asymp. Sig. (2-sided)
High	Pearson Chi-Square	90.000	87	.392
	Likelihood Ratio	68.559	87	.928
	N of Valid Cases	30	-	-
Medium	Pearson Chi-Square	60.000	58	.403
	Likelihood Ratio	42.931	58	.930
	N of Valid Cases	30	-	-

Table 2: Symmetric measures signifies the magnitude of the association between the subjects' stress and therapies

Stress			Value	Approx. Sig.
High	Nominal by Nominal	Phi	1.732	.392
		Cramer's V	1.000	.392
		Contingency Coefficient	.866	.392
	N of Valid Cases		30	-
Medium	Nominal by Nominal	Phi	1.414	.403
		Cramer's V	1.000	.403
		Contingency Coefficient	.816	.403
	N of Valid Cases		30	-

Table 3: Chi-Square vs. likelihood ratio to find association within-subjects age and various therapies

Stress		Value	df	Asymp. Sig. (2-sided)
High	Pearson Chi-Square	36.324	39	.593
	Likelihood Ratio	39.420	39	.451
	N of Valid Cases	30	-	-
Medium	Pearson Chi-Square	27.589	26	.379
	Likelihood Ratio	23.156	26	.624
	N of Valid Cases	30	-	-

Table 4: Symmetric measures signifies the magnitude of the association between the subjects' age and therapies

Stress			Value	Approx. Sig.
High	Nominal by Nominal	Phi	1.100	.593
		Cramer's V	.635	.593
		Contingency Coefficient	.740	.593
	N of Valid Cases		30	-
Medium	Nominal by Nominal	Phi	.959	.379
		Cramer's V	.678	.379
		Contingency Coefficient	.692	.379
	N of Valid Cases		30	-

Table 5: Summary of all diseases (category-1) and therapies adopted by the participants with 2 types of stress

Stress			Therapy				Total
			Diet	Homeopathy	Hormonal	No	
High	Disease1	Hyperprolactinemia	5	1	0	4	10
		Infertility	0	0	6	0	6
		PCOD	12	1	0	0	13
		PCOS	0	1	0	0	1
	Total		17	3	6	4	30
Medium	Disease1	PCOD	0	0	-	7	7
		PCOS	8	1	-	14	23
	Total		8	1	-	21	30

Table 6: Chi-Square vs. Likelihood ratio to find association within-subjects diseases (category-1) and therapies

Stress		Value	df	Asymp. Sig. (2-sided)
High	Pearson Chi-Square	47.729	9	.000
	Likelihood Ratio	42.642	9	.000
	N of Valid Cases	30	-	-
Medium	Pearson Chi-Square	3.913	2	.141
	Likelihood Ratio	5.863	2	.053
	N of Valid Cases	30	-	-

Table 7: Symmetric measures signifies the magnitude of the association between diseases (1) and therapies

Stress			Value	Approx. Sig.
High	Nominal by Nominal	Phi	1.261	.000
		Cramer's V	.728	.000
		Contingency Coefficient	.784	.000
	N of Valid Cases		30	-
Medium	Nominal by Nominal	Phi	.361	.141
		Cramer's V	.361	.141
		Contingency Coefficient	.340	.141
	N of Valid Cases		30	-

Table 8: Summary of all diseases (category-2) and therapies adopted by the participants with 2 types of stress

Stress			Therapy				Total
			Diet	Homeopathy	Hormonal	No	
High	Disease2	Obesity	5	2	2	4	13
		Pro-obesity	12	1	4	0	17
	Total		17	3	6	4	30
Medium	Disease2	Obesity	8	1	-	21	30
	Total		8	1	-	21	30

Table 9: Chi-square vs. Likelihood ratio to find association within-subjects diseases (category-2) and therapies

Stress		Value	df	Asymp. Sig. (2-sided)
High	Pearson Chi-Square	7.482	3	.058
	Likelihood Ratio	9.000	3	.029
	N of Valid Cases	30	-	-
Medium	Pearson Chi-Square	-	-	-
	N of Valid Cases	30	-	-

Table 10: Symmetric measures signifies the magnitude of the association between diseases (2) and therapies

Stress			Value	Approx. Sig.
High	Nominal by Nominal	Phi	.499	.058
		Cramer's V	.499	.058
		Contingency Coefficient	.447	.058
	N of Valid Cases		30	-
Medium	Nominal by Nominal	Phi	-	-
	N of Valid Cases		30	-

Table 11: Summary of all diseases (category-3) and therapies adopted by the participants with 2 types of stress

Stress			Therapy				Total
			Diet	Homeopathy	Hormonal	No	
High	Disease3	Low Bone Mass	15	2	6	3	26
		Normal Bone	1	0	0	0	1
		Osteoarthritis	1	1	0	1	3
	Total		17	3	6	4	30
Medium	Disease3	Low Bone Mass	7	1	-	10	18
		Normal Bone	1	0	-	9	10
		Osteoarthritis	0	0	-	2	2
	Total		8	1	-	21	30

Table 12: Chi-Square vs. Likelihood Ratio to find association within-subjects diseases (3) and therapies

Stress		Value	df	Asymp. Sig. (2-sided)
High	Pearson Chi-Square	4.515	6	.607
	Likelihood Ratio	4.654	6	.589
	N of Valid Cases	30	-	-
Medium	Pearson Chi-Square	4.615	4	.329
	Likelihood Ratio	5.670	4	.225
	N of Valid Cases	30	-	-

Table 13: Symmetric Measures signifies the magnitude of the association between diseases (3) and therapies

Stress			Value	Approx. Sig.
High	Nominal by Nominal	Phi	.388	.607
		Cramer's V	.274	.607
		Contingency Coefficient	.362	.607
	N of Valid Cases		30	-
Medium	Nominal by Nominal	Phi	.392	.329
		Cramer's V	.277	.329
		Contingency Coefficient	.365	.329
	N of Valid Cases		30	-

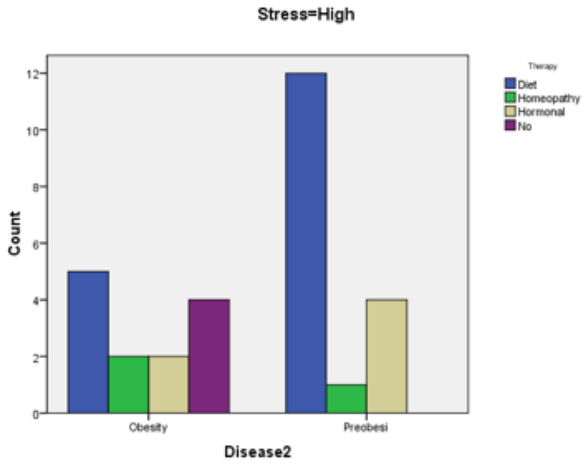

Fig. 5: Disease (2) wise high-stressed patients' therapy;

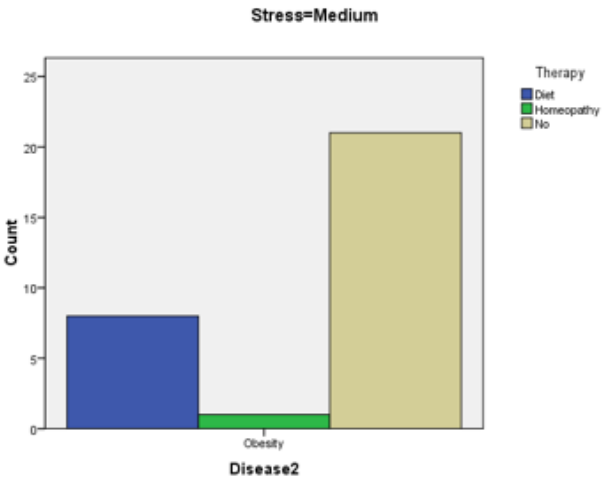

Fig. 6: Disease (2) wise medium-stressed patients' therapy

4. Discussion

Overall, the study assessed the links between high (30) and medium level (30) stress of women entrepreneurs in a

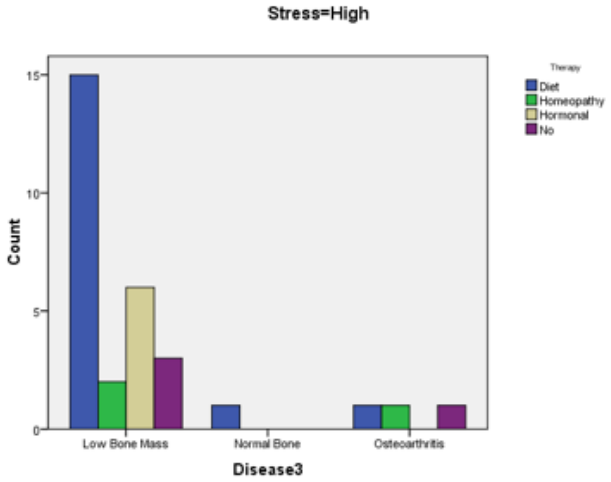

Fig. 7: Disease (3) wise high-stressed patients' therapy.

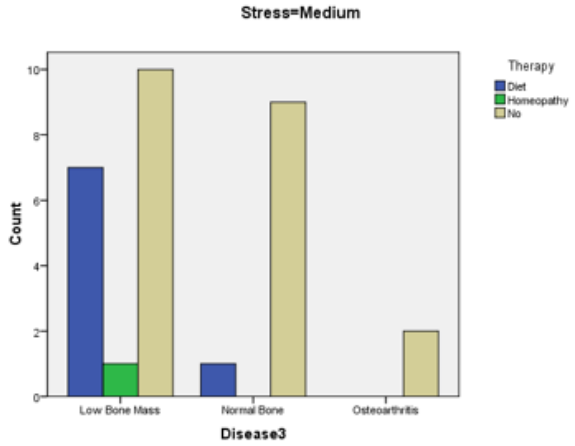

Fig. 8: Disease (3) wise medium-stressed patients' therapy.

metro city like Kolkata with common metabolic diseases. The diseases included pre obesity and obesity (in Asian value), polycystic ovarian syndrome for some women, and a few of them only polycystic ovarian disease. Some of them suffered from hyperprolactinemia; infertile participants were also under hormonal treatment for infertility. The PCOD age group was mainly 30-40 years old, but all the mentioned health issues were observed throughout the study age group. Table 5 shows the numbers of high and medium-type participants suffering from the diseases-1 category, which means PCOS, PCOD, infertility, hyperprolactinemia. In contrast, Table 8. shows the pre-obesity and obesity, which were under the disease -2 category as per this study inclusions. The summary Table 11 discussed bone health under 3 types low bone mass, osteoarthritis, and average bone mass. All the respective 3 tables demonstrated negative correlations with the separate disease category and types of therapies commonly considered for the participants. SPSS-22 was used for the analysis where crosstab was applied for enlisting the subjects' numbers, age, diseases category,1,2,3 in the row and stress in the column and therapy (all types) in the layer1of 1 at last box. We also analyzed 'clustered bar charts' by clicking there apart from the 'statistics' part to focus on chi-square, correlations, contingency coefficient, Phi and Cramer's V. We added Cochrane and Mantel Haenszel statistics. In short, the diet was essential in this study, mainly for the participants suffering from PCOS, infertility, obesity, and other metabolic syndromes. India is a country where enough sunlight is available; still, women entrepreneurs are very busy in indoor work; hence low vitamin D is one of the significant issues that lead to low bone mass or osteoarthritis. Mainly this study is stress-oriented; therefore, stress can be directly or indirectly related to metabolic syndrome. The participants must go with a proper diet and exercise but not any fad diet or so-called crash diets.[11]

5. Conclusion

Stress is one of the major causes of lifestyles diseases cum metabolic disorders, mainly in urban areas. The working women group is one of the most affected populations; however, middle-aged women usually suffer from hormonal diseases due to stress, improper dietary habits, and insufficient exercise. Therefore, working women with high or medium stress must spend some time for mild to moderate exercises and proper diet to avoid stress-sourced disorders or other health issues.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Basu BR, Chowdhury O, Saha SK. Possible Link Between Stress-related Factors and Altered Body Composition in Women with Polycystic Ovarian Syndrome. *J Hum Reprod Sci*. 2018;11(1):10–8. doi:10.4103/jhrs.JHRS_78_17.
2. Legro RS. Obesity and PCOS: implications for diagnosis and treatment. *Semin Reprod Med*. 2012;30(6):496–506.
3. Booij SH, Bos EH, MEJ B, van Faassen M, Kema I, Oldehinkel A, et al. Cortisol and α-Amylase Secretion Patterns between and within Depressed and Non-Depressed Individuals. *PLoS One*. 2015;10(7):e0131002. doi:10.1371/journal.pone.0131002.
4. Akiyama H, Amano H, Bienenstock J. Rat tracheal epithelial responses to water avoidance stress. *J Allergy Clin Immunol*. 2005;116(2):318–24. doi:10.1016/j.jaci.2005.03.040.
5. Ra L. Comprehensive Gynecology. In: Hyperprolactinemia, galactorrhea, and pituitary adenomas: etiology, differential diagnosis, natural history, and management," in Comprehensive Gynecology. Amsterdam, Netherlands; 2016. p. 853–64.
6. Van Der Valk E, Savas M, Van Rossum E. Stress and Obesity Are There More Susceptible Individuals. *Curr Obes Rep*. 2018;7(2):193–

203. doi:10.1007/s13679-018-0306-y.
7. Gunnar M, Quevedo K. The neurobiology of stress and development. *Annu Rev Psychol*. 2007;58(1):145–73. doi:10.1146/annurev.psych.58.110405.085605.
8. Kelly RR, Mcdonald LT, Jensen NR, Sidles SJ, Larue AC. Impacts of Psychological Stress on Osteoporosis: Clinical Implications and Treatment Interactions. *Front Psychiatry*. 2019;10:200. doi:10.3389/fpsyt.2019.00200.
9. Turner-Mcgrievy G, Davidson CR, Billings DL. Dietary intake, eating behaviors, and quality of life in women with polycystic ovary syndrome who are trying to conceive. *Hum Fertil (Camb)*. 2015;18(1):16–21.
10. Straits BC. Approaches to social research. Oxford University Press; 2005.
11. Banerjee S. Fad diets on metabolic syndrome among sedentary women - A systemic review. *IP J Nutr Metab Heal Sci*. 2021;4(1):34–40. doi:10.18231/j.ijnmhs.2021.006.

Author biography

Pallab Bera, Senior Resident

Swapan Banerjee, Scholar

Cite this article: Bera P, Banerjee S. A study on the relationship between stress-associated lifestyles disorders and essential preventive therapy among women entrepreneurs. *Panacea J Med Sci* 2023;13(2):269-276.