



A SAMPLE SURVEY ON REPRODUCTIVE WOMEN TO ASSESS LEVEL STRESS IN SUB-URBAN POPULATION, SOUTH CHENNAI, INDIA

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ABSTRACT

The Community based Sample Survey aimed at assessing the Prevalence of Stress experienced by the 1050 women of reproductive age(18-45) years. This study was conducted over a period of two years as Cross-Sectional in Sub-Urban South Chennai. The variables on demography and Stress were collected by Personal Interview method in a pre-structured standardized questionnaire after a pilot study. The main findings showed 856 (81.5%) women had experienced Stress, where 54 (5.1%) had Severe Stress. Women with Abdominal Obesity ≥ 0.85 [$\chi^2 = 11.9(P=0.001)$] and from the Nuclear family [$\chi^2 = 16.9(P=0.000)$] had a significant association with the Stress Outcome. There existed an insignificant difference in the mean Stress scores between the women age less than or above 30 years. The homemakers were equally experiencing stress with their counterpart women who were bound to work outside home. Family History of Couple misunderstanding, Ill Health of family member and Major Mortgage also showed significant difference in their mean stress levels by Student-t-test. The maximum mean difference in stress scores was identified by multiple comparison Post-Hoc Pairwise LSD test between the women who completed 10 and 15years of education ($P=0.000$). We conclude that the 'Women with Stress and at Risk of developing further Illness' should be identified at the earlier age for health assistance for a better life.

Keywords: Stress, Household survey, Sampling, Holmes & Rahe stress scale, Abdominal obesity, Post Hoc test.

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1. INTRODUCTION

An increased focus on Health and well-being of women is implemented in this Research Era, but few studies have identified differences between subgroups of women in terms of stress

sources, symptoms, coping strategies and help-seeking behavior. Carol Darling, et al. [1] in their study indicated that women in midlife, who experienced more stressful life changes and had higher body mass index scores, slept fewer hours and had greater health stress, which resulted in lower life satisfaction. Danielle Giuseffi, et al. [2] emphasized the importance of considering the unique characteristics of women when providing them stress management interventions. Dagmar, et al. [3] investigated the relations between stress and other psychosocial factors, and compared stress levels registered at 18 years' interval and found factors related to work conditions, as well as to family circumstances were independently associated. Smoking was associated with higher stress levels, whereas leisure time physical activity was protective. A survey [4] conducted between February 2011 and April 2011, covering 6,500 women from 21 developed and developing countries such as Sweden, the US, the UK, France, Thailand, Malaysia, China and India by Global Research Firm Nielsen, mentioned that Indian women across the world are the most stressed for time, with 87 per cent of respondents stating they felt stressed most of the time and 82 per cent claiming they had no time to relax and the biggest stress is felt among women of (25-55) years of age.

1.1. Objectives

- To assess the Prevalence of Stress among Women of reproductive age.
- To find the factors associated with their Stress levels and test for Statistical Significance.

This study was sanctioned by the Institutional Research and Ethical Committee Board (www.icmr.gov.in /human ethics, 2014) of Sree Balaji Medical College & Hospital, Chennai.

2. MATERIALS AND METHODOLOGY

Study Design : Cross –Sectional Study: Household Survey [5]

Study period : July 2012 to Dec 2014

Study Area : Sripuram & Anakaputhur, Sub-Urban area of Chennai City, Tamilnadu, India

Sample Size : With reference to Pilot Survey conducted in Sripuram [6]

Prevalence of STRESS among women in Sub-Urban Chennai, P = 69.5%

With 5% of Type I error(α), $Z_{\alpha} = 1.96$

Limit of accuracy as 5%, L% (P) = 5% (69.5)

With 20% attrition added to the sample size formula (www.bphc.hrsa.gov/, 2012).

$$N = \frac{Z_{\alpha}^2 P (1-P)}{[L\% (P)]^2}$$

$$N = 674.35 + 20\% (674.35) = 674.35 + 134.87 = 809.22 \approx 810$$

The minimum required sample size was estimated to be 810 women.

Sampling Technique: Two – Stage Sampling [7]

Stage 1 : Therefore, 1200 out of 10,748 households from Sripuram (500) & Anakaputhur (700) area of South Chennai was randomly selected by

Systematic Random Sampling method. [i.e. every ninth household was selected from the Sampling frame]

Stage 2 : One women of the age group (18-45) years were recruited by Simple Random Sampling method at the spot and women participated with the written informed consent.

Data : Primary

Method : Personal Interview method [8]

Material : Structured Form in the Vernacular language with

(a) Socio-Demographic Profile

(b) [9] Stress Scale for Adults

The information's were collected from the participants after obtaining the written informed consent. The Standardized Holmes & Rahe Stress Scale for Adults was administered on 1200 Women of reproductive age (18- 45) years, i.e. the number of "Life Change Units" that apply to events in the past one year of an individual's life are added and the final score gave an estimate on Stress [Score <150 is Nil, Score=150 is Mild, Score=(151-299) is Moderate & Score ≥300 is Severe].

3. STATISTICAL ANALYSIS

The responses on Demographic, Psychosocial Variables and the Stress Scale Items multiplied with the "Life Change Units" were analyzed using SPSS 20.0 [10]. The results of 1050 women are presented in this paper and randomly selected information on 150 women were utilized for testing the validity of the data. The Stress Outcome was Categorized as "YES / NO" and Chi-Square was used to test for categorical information's. Student-t-test for two samples or ANOVA compared the mean scores on stress for variables of interests (i.e. age, completed years of education, occupation, marital status, socio-economic status etc.) and Post-hoc: LSD for multiple comparison were employed to test for statistical significance at 5% type I error and 5% type II error [11]. The percentage value is presented within parentheses.

4. RESULTS

The present study comprised of 636(60.6) women less than or equal to 30years and 414(39.4) above 30 years ranging from 18 to 45 years with mean \pm SE (mean) of 29.8 ± 0.2 years. We observed a maximum of 302(28.8) women completed education till tenth and the total years ranged between 5 to 17years with 10.5 ± 0.1 years. Majority 891(84.9) were Hindus, 842(80.2) housewife, 88(8.4) of them in the managerial post and 61(5.8) skilled employees with Per Capita Income per month ranging from INR 375/- to INR 26,666/- with an average INR 3165/- \pm 93.3/-. Based on Mangal, et al. [12] BG Prasad Classification of Socio-economic status for Urban, 554(39.6) were from middle class and 268(25.5) from lower class. One hundred and thirty two (12.6) women had a family with more than 3 males ranging between 1 to 7 with 2.1 ± 0.03 and 175(16.7) of them had more than 3 females ranging from 1 to 6 with 2.5 ± 0.03 in their family.

There were 747(71.1) Women with a family size greater than five and 672(64.0) belonged to nuclear family. The age at menarche ranged from 11 to 16 years with mean 13.3±0.04years, age at marriage ranged from 18 to 30years with 21.5±0.07years, where 848(80.8) were married, 10(1.0) separated and 192(18.3) unmarried. Nine hundred and sixty seven (92.1) women were on mixed diet.

The majority of 955(91.0) had (Waist Hip ratio≥ 0.85) [13] ranged from 0.8 to 0.99 with mean 0.9±0.0, and 259(24.5) with either communicable or non-communicable diseases [14]. Forty two (4.0) women were diabetic as defined by Fletcher, et al. [15] and 394(37.5) had family history of diabetes, 246(23.4) with family history of hypertension and 338 (32.2) of the women's family members suffered illness. Twenty one (2.0) had family history of Violence and 67(6.4) women

Table-1. Inferential Statistics for the Socio - Demographic Variables

Variables	Stress Outcome			Variables	Stress Outcome			
	NO (N)	YES (N)	χ ² - value (P-value)		NO (N)	YES (N)	χ ² - value (P-value)	
1.Age - ≤ 30	124	512	1.116	8.FamilyMember	60	243	0.497	
> 30	70	344	(0.291)					
2.Level of Education				< 5	134	613	(0.481)	
Primary	25	102	30.042 (0.000)*	9. Family Type				
ESSLC	39	171		Nuclear	149	523	16.933	
Secondary	37	265		Joint	45	333	(0.000)*	
Higher				10. Marital Status				
Secondary	26	153		Unmarried	24	168	5.572 (0.062)	
UG	41	119	Married	168	680			
PG	26	46	Separated	2	8			
3.Religion			(0.000)*	11. Diet			0.241	
Hindu	163	728	10.104 (0.039)*	Vegetarian	17	66	(0.624)	
Muslim	6	84		Mixed	177	790		
Christian	25	44						
4.Occupation				12. Physical Activity				
Housewife	169	673	52.489 (0.000)*	Inactive	7	98	48.928 (0.000)*	
Semi-Skilled	5	37		Minimally	30	247		
Skilled	4	57		Active	142	391		
Managerial	12	76		Normally Active	15	120		
Student	4	13		Hyper Active				
5.Socio Economic Status#				13.Abdominal Obesity				
Lower Class	0	84	0.328 (0.567)	< 0.85	30	65	11.905 (0.001)*	
Upper Lower	46	138		≥ 0.85	164	791		
Lower Middle	41	191						
Upper Middle	39	283		14. BMI				
Upper Class	68	160		≤ 25	147	698		5.257 (0.072)
6. Males - ≤ 3	172	746	26 - 30	38	113			
> 3	22	110	≥ 30	9	45			
7. Females - ≤ 3	156	719	(0.227)					
>	38	137						

BG Prasadh Classification 2015, * Statistically Significant @ 5%

With family history of couple misunderstanding, 886(84.4) had foreclosure of loan, 320(30.5) had change in working conditions and 225(21.4) had change in diet pattern respectively. Holmes

and Rahe Stress Scale: The 41 items from this scale measured the number of 'Life change Units' over the past one year experienced by our participants. We observed a Prevalence of 81.5percent of Stress among the Women (i.e. 856 out of 1050). Table 1 shows the association of the Socio-Economic and Demographic variables with the Stress Outcome & Fig 1 highlights the distribution of women according to their Stress levels i.e.16(1.5) women had mild stress, 786(74.9) had moderate stress and 54(5.1) were severely stressed and ranged from 48 to 475 with an average 199.7 ± 1.7 respectively.

The Student-t-test for independent samples applied to psychosocial variables highlighted that One hundred and fifty five (14.8) had a family history of mental illness with a stress score of 255.5 ± 9.3 [$t=8.429(P=0.000)$], 20(1.9) were ill-treated by family members & had a score of 282.7 ± 12.4 [$t=6.611(P=0.000)$], those 10(1.0) with hypertension had a score 256.3 ± 23.4 [$t=3.122(P=0.002)$], and 920(87.6) on major mortgage in the past one year had a score 202.4 ± 1.8 [$t=4.012 (P=0.000)$], 474(45.1) with moderation in living condition had a score 210.4 ± 2.3 [$t=5.533(P=0.000)$] and 318(30.3) frequently participated in gatherings had a score 228.3 ± 3.7 [$t=11.19(P=0.000)$] respectively which were are all statistically higher stress scores with the 'No Stress' group. Other variables did not show statistically significant mean difference in the stress scores.

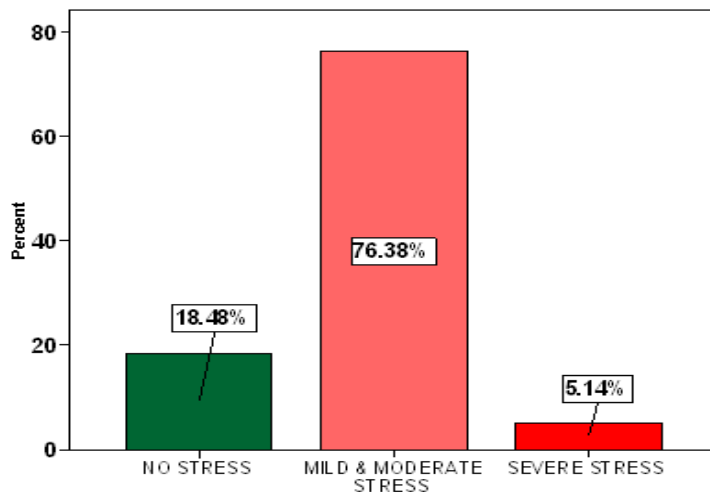


Fig-1. Prevalence on Stress Levels

Source: P. S. S. S. Rao and J. Richard, Introduction to biostatistics and research methods, 5th ed. New Delhi: PHI Learning Pvt. Ltd, 2012

One way ANOVA test on women's education showed a significant difference between the levels with $F=11.74(P=0.000)$, the Post-hoc LSD pairwise test for multiple comparisons showed a maximum mean difference of 37.9 between women who completed 10 years and 17 years with 95% confidence interval 23.4 to 52.4 ($P=0.000$). Even though majority 891 women were Hindus, 90 Muslim women experienced higher stress of 219.9 ± 6.3 and there existed significant difference in religions with $F=15.503(P=0.000)$.

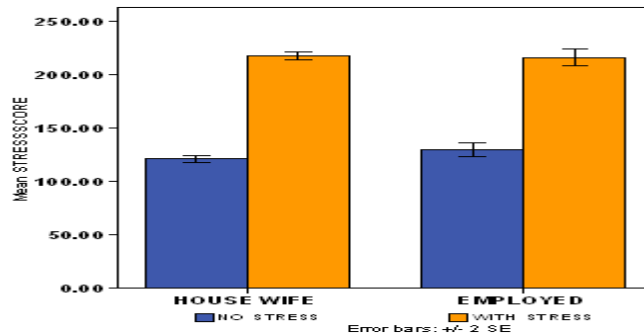


Fig-2. Mean stress score for Occupation

Source: T. H. Holmes and R. H. Rahe, "The social readjustment rating scale," J. Psychosom Res., vol. 11, pp. 213-218, 1967.

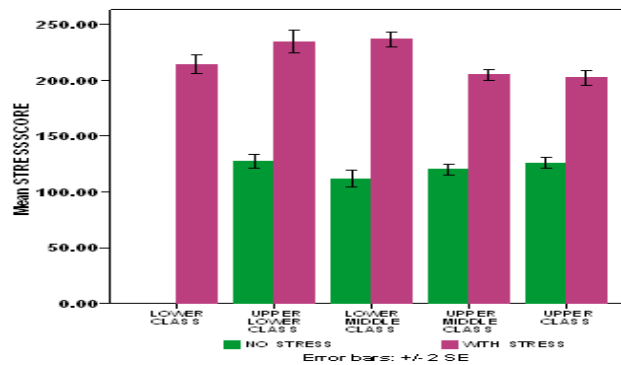


Fig-3. Mean Stress Score for Socio Economic Status

Source: P. Roxy and J. L. Devore, Statistics: The exploration and analysis of data, 7th ed. San Luis Obispo: Brooks /Cole, 2011.

We did not observe a statistically significant difference in the stress scores between the occupation statuses as produced in Fig 2. The Post-hoc test showed a maximum mean difference of 38.5 ± 16.6 between semi-skilled workers and students with confidence interval 5.8 to 71.7 ($P=0.021$) followed by 37.8 ± 15.8 between Skilled workers and Students with confidence interval 6.8 to 68.9 ($P=0.017$). There existed a mean stress score difference between the Socio Economic Status of the women with $F=14.4$ ($P=0.000$), where the highest score of 214.8 ± 4.2 was observed in the lower class as shown in Fig 3 and the Post-hoc test showed a maximum mean difference of 35.2 ± 5.2 between lower middle class and upper class with confidence interval 24.9 to 45.5 ($P=0.000$) followed by 34.7 ± 7.1 between lower class and upper class with confidence interval 20.6 to 48.8 ($P=0.000$).

One hundred and thirty five hyper active (<http://www.ipaq.ki.se>, 2005) women had the highest stress score of 215.6 ± 5.5 followed by 277 minimally active women with 208.7 ± 3.4 , next by 105 inactive women with 207.1 ± 4.1 and 533 normally active women with 189.6 ± 2.4 was statistically significant $F=12.0$ ($P=0.000$). The Post-hoc test showed a maximum mean difference of 26.0 ± 5.4 between hyperactive and normally active women with confidence interval 15.2 to 36.7 ($P=0.000$). Eight hundred and forty five (80.5) women with $BMI \leq 25$ (<http://whqlibdoc.who.int/publications>, 2011), had a maximum stress of 201.5 ± 1.9 followed by 151 (14.4) women with $BMI = (26-30)$ with score 198.1 ± 5.8 and 54 (5.1) women with $BMI > 30$

with score 176.8 ± 4.6 , as well their differences were significant $F=4.71(P=0.009)$. The Post-hoc test showed a maximum mean difference of 24.6 ± 8.0 between women with $BMI \leq 25$ and $BMI > 30$ confidence interval 8.7 to 40.4 ($P=0.002$) followed by 21.2 ± 9.1 between women with $BMI= (26-30)$ and $BMI > 30$ with confidence interval 3.3 to 39.1 ($P=0.020$).

The 229 women with non-communicable disease had highest stress score 213.6 ± 4.6 compared to 30 women with communicable disease with 168.1 ± 8.6 and 791 women with no illness experienced 196.9 ± 1.8 respectively and their differences were significant $F=12.3$ ($P=0.000$). The Post-hoc test showed a maximum mean difference of 45.5 ± 11.1 between women who had non-communicable disease and women with communicable disease with confidence interval 23.7 to 67.3 ($P=0.000$) followed by 28.8 ± 10.6 between healthy women and women who had communicable disease with confidence interval 7.9 to 49.6 ($P=0.000$).

The main findings of this study are:

1. Prevalence of Stress among women in the study area was 81.5%.
2. Holme & Rahe Stress Scale recognised 74.9% of women with moderate risk and 5.1% at high risk of developing illness.
3. The 'Housewife' were equally experiencing Stress with their counterpart Women who were bound to work outside home.
4. Women with 'Abdominal Obesity' ($WHR \geq 0.85$) had significant association with Stress.
5. Women with Non-Communicable diseases were more stressed.

5. DISCUSSION

Stress experienced by younger women (≤ 30 years) was slightly high compared to the elder women in this study as studied by other researchers [16], [17]. Our Students were mildly stressed compared to professional students of Shashank Behere, et al. [18] and University students from El Ansari, et al. [19]; El Ansari, et al. [20].

The highest stress score of 213.5 ± 7.9 was noticed among our women in managerial posts followed by the skilled workers with 212.8 ± 8.0 and the house wife with a score 198.3 ± 1.9 respectively as observed among IT professionals in Chennai by Vimala and Madhavi [21] & in Pakistan [22] and also 63(6.0) women experienced cheap psychological atmosphere at work place with a score of 218.8 ± 4.5 [$t=2.709(P=0.007)$] as stated in Ranjit and Mahespriya [23]. Exactly 725 (69.0) women faced rapid change in financial condition & had a moderate stress score of 210.2 ± 1.9 [$t=9.163$ ($P=0.000$)] & in Xiao, et al. [17]'s study 3.5 percent women were heavy stressors due to business failure.

The present study identified 10 'separated' women experiencing the highest stress score of 256.8 ± 23.4 compared to 192 unmarried women with 199.6 ± 3.4 and 848 married women with 199.1 ± 2.0 which was statistically significant $F=4.873(P=0.008)$. The Post-hoc test showed a maximum mean difference of 57.1 ± 18.3 between separated and married women with confidence

interval 21.2 to 93.1 ($P=0.002$) and Darshan, et al. [24] found that 43.9% singles, 35.7% married and 60% who were committed but unmarried were at risk of developing depression.

We also observed 2.5 percent had irregular menstruation and those with 'Abdominal Obesity' had significant association with Stress. Singh [16] study reveals that Women with high WHR (0.80 or higher) have significantly lower pregnancy rates than women with lower WHRs (0.70–0.79), independent of their BMIs and suggests that WHR is an accurate 'somatic indicator' of reproductive endocrinological status and long-term health risk. Our study reported 409(39.0) participants with disturbed sleep and a moderate stress score 207.3 ± 2.7 [$t=3.401(P=0.001)$] where [1] found that women who slept few hours had greater health stress.

The majority of 229 women were suffering from illness like headaches, insomnia, eating disorder, allergies, backaches, irritable bowel syndrome, frequent cold and fatigue and also diseases such as hypertension, diabetes, asthma, Knee pain, sinus, depression, dementia & wheezing were all ailments caused by biochemical effects of Stress stated by the 'Father of Stress Research'- Hans Selye, 1936, [25]. Twenty nine 29 (2.8) participants suffered with common cold and People under chronic stress are prone to more frequent and severe viral infections, such as the flu or common cold, and vaccines such as the flu shot are less effective for them (www.nlm.nih.gov/medlineplus, 2014) and nearly 6.2percent of our participants said that they were experiencing dementia, a follow-up study on women for 35 years was the first research in Sweden to indicate a link between Psychological stress in middle age could lead to the development of dementia later in life [26].

6. CONCLUSION

In this present sample survey, the prevalence of STRESS among reproductive women were comparatively higher to the western studies and the 'homemakers' equally experienced stress with their counterpart who were bound to work outside home. Modern life exposes individuals to many, recurrent stressful situations in and out of home. If we are able to identify the quality and quantity of stress at the younger age of women, it will be advisable and beneficial to adopt coping strategies like walking, physical exercise, aerobics, relaxation and stress reduction techniques as well as therapy -- to reduce the amount of stress and prevent stress-related disorders in our lives.

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