

# Prevalence and Determinants of Job Stress among Handloom Weavers in Rural Tamil Nadu: A Community-Based Cross-Sectional Study

Vijayakarthiskeyan M<sup>1</sup>, Raju Kannan S<sup>2</sup>, Thamarai Kannan S<sup>3</sup>, Sangeetha S<sup>4</sup>, Angeline Grace<sup>5</sup>, Ritikaa S<sup>6</sup>, Shakthe Priya NK<sup>7\*</sup>

<sup>1-4</sup>Department of Community Medicine, Vinayaka Mission's Kirupananda Variyar Medical College and Hospitals, Vinayaka Missions Research Foundation Deemed to be University (VMRF DU), Salem, Tamil Nadu, India

<sup>5</sup>Department of Community Medicine, Sree Balaji Medical College and Hospital, Bharath Institute of Higher Education and Research (BIHER) Deemed to be University, Chennai, Tamil Nadu, India

<sup>6</sup>CRMI, Vinayaka Mission's Kirupananda Variyar Medical College and Hospitals, Vinayaka Missions Research Foundation Deemed to be University (VMRF DU), Salem, Tamil Nadu, India

<sup>7</sup>Department of Radio Diagnosis, Vinayaka Mission's Kirupananda Variyar Medical College and Hospitals, Vinayaka Missions Research Foundation Deemed to be University (VMRF DU), Salem, Tamil Nadu, India

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## ABSTRACT

**Background:** Occupational stress is one of the key psychosocial risk factors impacting health, productivity and safety of workers in the informal handloom weaving sector mainly in rural India. The objectives of the study were to estimate the prevalence of job stress among weavers and to determine the sociodemographic and work-related factors associated with job stress.

**Materials and Methods:** 530 weavers were enrolled using simple random sampling method. Validated New Job Stress Scale was used to assess job stress and based on the scores participants were classified into: low, moderate and high job stress. Data were analyzed by SPSS software (version 22) and prior ethical clearance was obtained.

**Results:** Nearly 20.8% had poor work-life balance, 44.2% reported lack of coworker support, 13.4% participants had high job stress and 33.3% had moderate job stress. Male gender (AOR = 2.28, 95% CI: 1.08-5.01), work hours (AOR = 1.46, 95% CI: 1.01-2.23) and poor work-life balance (AOR = 9.98, 95% CI: 4.90-20.32) were the independent predictors of high job stress on multivariable analysis.

**Conclusion:** Work place interventions that address regulated hours of work, supportive work environments and better balance between work life are necessary to protect mental health and ensure sustainable production in the informal textile sector.

**Keywords:** Mental health, Handloom industry, Work life balance, Occupational stress, Cross sectional study

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**\*Correspondence:** Dr. Shakthe Priya NK (Email: communitymedicinevmkv@gmail.com)

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## INTRODUCTION

Occupational stress is identified as one of the leading psychosocial hazards for worker health, productivity and safety.<sup>1</sup> The prospective evidence that a variety of psychosocial exposures, including high demands, low control, low support and effort-reward imbalance are risk factors for stress-related mental disorders as well as downstream health problems is of particular interest.<sup>2</sup> Further meta-analytic evidence supports the role of workplace psychosocial stressors in increasing the risk of mental health-related sickness absence.<sup>3</sup> Small and informal industries have high level of work stress and limited social protection ultimately exposing them to a great vulnerability to stress.<sup>1</sup>

The textile value chain engages millions of workers worldwide and a range of studies in textile/garment industries showed that work related stress is high.<sup>4</sup> A systematic review and meta-analysis among textile and garment workers showed 14% as the pooled prevalence of work related stress.<sup>5</sup> Long work hours, low wages, job insecurity, poor psychosocial environment being key associated factors for stress among textile workers.<sup>6</sup> Such stress is not only a mental health-related problem; it has been demonstrated to be associated with insomnia and depressive symptomatology that could impair occupational performance and quality of life additionally.<sup>7</sup>

Handloom weaving in rural India is typically carried out in household settings, cooperatives, or small-scale units, where workers must balance production demands, seasonal variability, physical workload, and domestic responsibilities.<sup>8</sup> In Tamil Nadu, handloom weaving constitutes a major rural occupation. However, the nature of this work characterized by prolonged working hours, physical strain, income instability, and lack of organized support systems may predispose workers to chronic psychosocial stress.<sup>9</sup> However, there is absence of community-based data on job stress among rural handloom weavers in Tamil Nadu.

Taking this background, this study was conducted to estimate the prevalence of job stress among the handloom weavers of rural Tamil Nadu and to find out the socio-demographic and work-related determinants.

## METHODOLOGY

**Study design and setting:** This was a cross-sectional analytical study carried out in rural villages Atayampatti and Veerapandi of Salem district, Tamil Nadu. The research included adult ( $\geq 18$  Years) handloom weavers for whom weaving was primary or significant secondary occupation.

**Study period:** Study was conducted from September 1<sup>st</sup> 2025 to January 31<sup>st</sup> 2026.

**Sample Size and Sampling Method:** The study enrolled 530 weavers. Because there are few previous estimates for the prevalence of job stress among weavers with a validated job stress scale, sample size was estimated from the conservative prevalence (50%) to achieve maximum sample size.<sup>10</sup> Sample size calculation was based on the formula of  $n = Z^2pq / d^2$ ,  $p = 50$ ,  $q = 50$ ,  $Z$  value with a confidence level of 95% ( $Z = 1.96$ ) and the absolute precision set at 4.5%, in which  $n$  is minimum required sample size. To account for an expected 10% non-response, the sample size was rounded off to 530. Although the sample size was primarily estimated for prevalence, it was also adequate for multivariable logistic regression. Based on the rule of a minimum of 10 events per predictor variable, with 71 cases of high job stress and six predictors included in the final model ( $EPV = 11.8$ ) the model demonstrated adequate stability.

Village wise list of weavers was listed with the help of local leaders and loom cooperatives. Participants were enrolled through a simple random sampling by computer derived random number tables.

**Inclusion and Exclusion criteria:** Individuals  $\geq 18$  years and have engaged in weaving for  $\geq 1$  year without interruption immediately preceding the survey. Continuous practice was defined as active participation in weaving as either a primary or secondary occupation, uninterrupted for no more than three consecutive months during the past year. Individuals who had not been involved in weaving activity during the three months prior to data collection due to sickness, change of occupation, seasonal migration or any other reason were excluded from this study.

**Data collection tool:** Data was collected through a semi-structured validated questionnaire including the following details such as sociodemographic characteristics, work related factors, psychosocial work stressors and New Job stress scale questions. The New Job Stress Scale (NJSS), developed by Shukla A et al<sup>11</sup> is a 27-item instrument encompassing four domains: job strain, role conflict, work-life balance and coworker support. The scale demonstrates good internal consistency (Cronbach's  $\alpha = 0.89$ ) and satisfactory construct validity. Items are rated on Likert scales, and higher scores indicate greater stress. The questionnaire was translated into Tamil using standard forward-backward translation procedures. In the present study, the Tamil version demonstrated good reliability (Cronbach's  $\alpha = 0.83$ ). For analytical purposes, stress levels were categorized into 'present' and 'absent'. Participants scoring above the median for a given domain were categorized as having the factor "present," whereas those with scores at or below the median were categorized as "absent." Accordingly, role conflict, job strain, work-life balance, and coworker support were each dichotomized into "present" and "absent" categories. High job stress was similarly classified based on the overall NJSS score.

**Socioeconomic Status (SES)** was measured using a Modified BG Prasad Scale 2025<sup>12</sup>, which classifies the individuals according to per capita income into five classes (Upper, Upper Middle, Lower Middle, Upper Lower and Lower). Upper/middle class (Classes I-III) and lower class (Classes IV-V) were combined for the analysis.

**Statistical analysis:** Data were analysed with SPSS Version 22. Descriptive statistics were used to summarise participant characteristics and Job stress prevalence. Chi-square assumptions were checked by investigating expected cell frequencies prior to application. The chi-square test was applied only when at least 80% of cells had expected counts  $\geq 5$  and no cells with expected count  $< 1$ . Fisher's exact test was used in the contingency tables with small expected cell counts. All those that were  $p < 0.05$  in bi-variable analysis, multivariable logistic regression was done to calculate adjusted odds ratio (AOR) and 95% confidence intervals.

**Ethical considerations:** The study was approved by the Institutional Ethical Committee of VMKVMCH (VMKVMC&H/IEC/25/046, Dated 11.07.2025). All participants gave written informed consent. Privacy was maintained by de-identification of data and limiting access to the data. Counseling and referral were given to participants with high Job stress.

This study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies.<sup>13</sup>

## RESULTS

In total, 760 weavers were screened for eligibility of which 120 were ineligible and 110 declined participations. Finally, 530 eligible participants were included in the study. All enrolled participants had completed the study instruments and were available for final analysis (n=530). Data were checked for completeness prior to analysis and there were no missing values.

Majority of workers (79.2%) felt that the work-life balance was satisfactory, 55.8% reported sufficient coworker support and role conflict was largely present among the sample with 96% mentioned experiencing it. More than one third of workers (43.2%) experienced job strain. In the weavers, 13.4% had high job stress, 33.3% moderate job stress and 53.3% low job stress.

Association between the sociodemographic variables and high job stress is presented in Table 1. A significantly higher percentage of males reported stress at work (84.5%) than females (15.5%). Male workers were more than three times as likely to report high job stress compared with female (OR = 3.37,  $p = 0.0004$ ).

Of the 530 individuals, one quarter (25.9%) declared they had any chronic comorbidities, three fifths (60.3%) were non-adherent in taking medication for comorbidities, and one in twelve (8.7%) mentioned work stress as a reason for regular use of sleep medications.

**Table 1: Sociodemographic factors associated with high job stress among weavers (N - 530)**

Sociodemographic factors	High Job Stress		Total (%) N = 530	P value	Unadjusted Odds ratio (95% CI)
	Present (%) (N = 71)	Absent (%) (N = 459)			
<b>Age (in years)</b>					
≥ 40 Years	45 (63.4)	298 (64.8)	343 (64.7)	0.809	0.93 (0.55 - 1.57)
< 40 Years	26 (36.6)	161 (35.2)	187 (35.3)	ref	
<b>Gender</b>					
Male	60 (84.5)	284 (61.8)	344 (64.8)	<b>0.0004*</b>	3.37 (1.72 - 6.71)
Female	11 (15.5)	175 (38.2)	186 (35.2)	ref	
<b>Religion</b>					
Hindu	70 (98.6)	452 (98.5)	522 (98.5)	0.946	0.92 (0.11 - 7.43)
Others	1 (1.4)	7 (1.5)	8 (1.5)	ref	
<b>Marital status</b>					
Married	62 (87.3)	417 (90.9)	479 (90.4)	0.320	0.67 (0.31 - 1.46)
Unmarried/Divorced/ Widowed	9 (12.7)	42 (9.1)	51 (9.6)	ref	
<b>Type of family</b>					
Joint /Three generation	23 (32.4)	161 (35.1)	184 (34.7)	0.675	0.89 (0.52- 1.52)
Nuclear	48 (67.6)	298 (64.9)	346 (65.3)	ref	
<b>Education</b>					
Illiterate	17 (23.9)	128 (27.9)	145 (27.4)	0.505	0.82 (0.45 - 1.46)
Literate	54 (76.1)	331 (72.1)	385 (72.6)	ref	
<b>Socioeconomic status</b>					
Lower class	54 (76.1)	356 (77.5)	410 (77.3)	0.778	0.92 (0.51 - 1.65)
Upper/Middle class	17 (23.9)	103 (22.5)	120 (22.7)	ref	

\*Statistically significant at  $p < 0.05$ , CI- Confidence Interval)

**Table 2: Work related factors associated with high job stress (N - 530)**

Work related factors	High Job stress		Total (%) (N = 530)	P value	Unadjusted Odds ratio (95% CI)
	Present (%) (N = 71)	Absent (%) (N = 459)			
<b>Years of experience</b>					
Upto 15 years	28 (39.4)	203 (44.2)	231 (43.6)	0.460	0.82 (0.49 - 1.37)
> 15 years	43 (60.6)	256 (55.8)	299 (56.4)	ref	
<b>Duty hours per day</b>					
> 8 hours	53 (74.7)	270 (58.8)	323 (61)	<b>0.012</b>	2.06 (1.17 - 3.63)
Upto 8 hours	18 (25.3)	189 (41.2)	207 (39)	ref	
<b>Number of holidays in a month (in days)</b>					
Upto 4 days	53 (81.7)	355 (77.4)	408 (77)	0.593	0.85 (0.47 - 1.52)
> 4 days	18 (18.3)	104 (22.6)	122 (23)	ref	
<b>Role conflict</b>					
Present	65 (12.7)	443 (2.8)	508 (95.9)	0.058	0.39 (0.14 - 1.03)
Absent	6 (87.3)	16 (97.2)	22 (4.1)	ref	
<b>Coworker support</b>					
Absent	45 (63.4)	190 (41.4)	235 (44.3)	<b>&lt;0.0001*</b>	2.46 (1.47 - 4.13)
Present	26 (36.6)	269 (58.6)	295 (55.7)	ref	
<b>Work-life balance</b>					
Absent	51 (71.8)	60 (13)	111 (20.9)	<b>&lt;0.0001*</b>	17.24 (9.61 - 30.95)
Present	20 (28.2)	399 (87)	419 (79.1)	ref	
<b>Job Strain</b>					
Present	30 (42.2)	199 (43.3)	229 (43.2)	0.861	0.95 (0.57 - 1.59)
Absent	41 (57.8)	260 (56.7)	301 (56.8)	ref	

\*Statistically significant at  $p < 0.05$ , CI- Confidence Interval)

**Table 3: Multivariate logistic Regression Analysis (N - 530)**

Variables	P value	AOR (95% CI)
Male gender	<b>0.032*</b>	2.28 (1.08 to 5.01)
Duty hours per day (> 8 hours)	<b>0.047*</b>	1.46 (1.01 to 2.23)
Lack of Co-worker support	0.296	0.88 (0.72 to 1.14)
No Work-life balance	<b>0.001*</b>	9.98 (4.90 to 20.32)

Model was found to be statistically significant (Cox and Snell  $R^2 = 0.393$ , Nagelkerke  $R^2 = 0.456$ ). The model demonstrated adequate goodness-of-fit (Hosmer-Lemeshow  $p = 0.553$ ). Reference categories: Female gender, Duty hours  $\leq 8$  hours, Presence of Co-worker support and Presence Work-life balance

Respiratory symptoms were rare: 11.1% of the participants had cough, while shortness of breath was reported by 3.9%, mainly occasionally. Also 84.7% had diverse Body mass index, and only 10.6 % were over weighted and obese.

The association between work-related factors and high job stress is shown in Table 2. Work hours per day was significantly associated with high Job stress ( $p < 0.012$ , OR = 2.06). Support from coworkers was also associated with high job stress ( $p < 0.001$ , OR = 2.46). Work-life balance had the strongest association with high job stress ( $p < 0.001$ , OR = 17.24).

In order to avoid conceptual and statistical overlap, 'job strain' has been removed from the regression model. Male gender (AOR = 2.28; 95% CI: 1.08-5.01;  $p = 0.032$ ), work hours per day (AOR = 1.46, 95% CI: 1.01-2.23),  $p = 0.047$ ). Lack of work-life balance (AOR = 9.98; 95% CI: 4.90-20.32;  $p = 0.001$ ) were the independent predictors of high job stress after adjustment. This finding emphasizes the importance of work-life blend in promoting psychological health (Table 3). Nagelkerke  $R^2$  value (0.456) appears relatively high for a community-based occupational study with modest event prevalence. It likely reflects

the strong combined predictive contribution of the variables included in the model.

## DISCUSSION

The current study investigated the burden and factors contributing to job stress among weavers in rural part of Tamil Nadu. A relatively high percentage of workers reported the experience of job stress and such psychosocial strain is a significant but frequently overlooked in non-textile weaving industries.

Our study presents a relatively modest psychosocial stress burden among weavers, including only 13.4% with high job stress. In contrast study among Indian weaving workers have documented a substantial burden of psychosocial stressors, including mental overload and high work demands.<sup>14</sup> Similarly, Mukherjee P et al<sup>15</sup> claimed that housemaids had higher occupational stress, due to insecurity of the work and if the role was indistinct. In more formal work environments, the studies of Anandi B et al<sup>16</sup> and Dhakate MA et al<sup>17</sup> reported greater work stress and role conflict in terms of workload responsibility and administrative tasks.

Our study results showed sex to be a significant predictor for job stress among sociodemographic variables. Male employees were more likely to report stress than female employees and this association remained statistically significant after adjustment in multivariate analysis. The rural working population is characterised by men, who commonly have occupational obligations, are usually engaged in heavy physical work and spend longer hours in paid employment. These combined pressures may account for their heightened stress sensitivity in our study. Comparable findings are reported in textile and manufacturing work in other places.<sup>18</sup> Age, education, marital status, family type, and religion did not show a significant association with stress in the present study. This finding is consistent with evidence from textile workers, where workplace characteristics such as job demand, work environment and organizational factors were significantly associated with stress, while sociodemographic variables showed limited or no significant association.<sup>6</sup>

There was significantly higher stress in workers who worked more than eight hours daily in our study. Although adjusting for other factors, long work hours was an independent predictor of stress in our study. Long work hours deprive people of sleep, decrease time for recovery and result in accumulated fatigue, leading to impairment of mental health. In other longitudinal studies it has also been shown that long working hours increase the likelihood of psychological distress and burnout.<sup>19</sup> Workers may feel greater emotional strain when they receive contradictory orders or are placed under unreasonable demands by superior during efforts to achieve production goals. In our study there was no significant association between role conflict and job stress which was not consistent with previous literature which identifies psychosocial work factors, including job demands and role-related stressors as important contributors to occupational stress disorders.<sup>20</sup>

Current study findings highlight that unsupportive coworker was strongly correlated with stress. Employees who felt their colleagues did not provide sufficient help or emotional support in our study were more likely to feel psychological stress. Among the variables examined, coworker support and work-life balance have been consistently identified in the literature as key protective occupational factors. A workplace-based study demonstrated that greater supervisor and coworker support were independently associated with reduced psychological distress and improved mental health among employees.<sup>21</sup> This current study findings highlight the protective nature of social support in occupational settings. The most significant single predictor found in the current research was negative work-life balance. After adjustment, those workers who mentioned difficulty balancing work and non-work life had almost 10 times the odds of being stressed in our study. Lack of leisure time, being away at work a long-time and as family obligation continues to increase in today's job

market, taking time off for rest becomes less frequent therefore in the absence of repose we suffer chronic strain leading to emotional exhaustion. Modern literature on occupational health continues to identify work-life imbalance as a significant source of stress and burnout.<sup>22</sup>

Our results indicate that job stress in weavers is primarily dependent on the modifiable work environment factors and not on intrinsic individual traits. Long on-duty hours, lack of social support and interference with private life may be the main causes to generate stress. As a result, the emphasis of preventive interventions should shift from those that concentrate on enhancing individual coping capacities to those taking into account working conditions, peer support and time off-duty. A public health approach incorporating occupational counseling services, organised work schedule, controlled hours of duty and supportive supervision into the weaving cooperatives would significantly alleviate psychological stress with concomitant increase in productivity. A very strong and independent effect of job stress was suggested by the high for poor work-life balance (AOR 9.98). This may point to the home-based character of weaving, where work and domestic roles can be blurred, resulting in long hours worked with insufficient rest. Moreover piece-rate payment systems are adding to economic pressure and accentuating stress. These contextual factors most probably account for this large effect size. The study findings might be generalizable to similar populations of home-based weaving and informal sector economic background with comparable socioeconomic and work environments. But caution should be exercised when trying to extrapolate to other regions or sectors with contrasting work environments.

The major strengths of this study are it contributes by addressing a relatively less investigated occupational group while studying the job stress among rural weavers working under informal and semi organized textile conditions utilizing a moderate sample size and application of a standardized, validated tool for stress estimation which enhanced reliability of our findings. Use of multivariate analysis made it possible to determine independent modifiable work-related predictors of stress, which adds to the public health importance of the study. But the cross-sectional nature does not allow for a causal inference and using self-reported data could cause reporting bias.

## CONCLUSION

This study emphasizes that occupational stress is a health risk in weavers and that duration of work, male gender shape and poor work-life balance shape job stress among weavers. These results also highlight the need for organisational and environmental interventions to effectively reduce stress. Measures that target working hours regulation, flexibility and

its control, the promotion of a supportive work culture and work-life integration are essential to protect the mental health of employees in addition to periodic mental health check-ups as part of routine service. Workplace counselling, stress management and work-life balance awareness programmes may also reinforce coping and resilience. At policy level, it is important to extend occupational health and social security coverage for working in the informal sector clothing areas for the improved well-being, productivity enhancement and long-term sustainability of occupation in textile sectors.

**Individual Authors' Contributions:** **VM** contributed to study conception, study design, data collection, and manuscript preparation. **RKS** was involved in study conception, data analysis and interpretation, and manuscript preparation. **TKS** contributed to all aspects of the study, including conception, design, data collection, data analysis and interpretation, and manuscript preparation. **SS** participated in data analysis and interpretation as well as manuscript preparation. **AG** and **RS** were involved in data collection and manuscript preparation. **SPN** contributed to study conception, study design, data collection, and manuscript preparation.

**Availability of Data:** The data supporting the findings of this study are available from the corresponding author upon reasonable request.

**Declaration of Non-use of Generative AI Tools:** This article was prepared without the use of generative AI tools for content creation, analysis, or data generation. All findings and interpretations are based solely on the authors' independent work and expertise.

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