

# Self Rated Assessment of Stress due to Physical Environment & Job Requirements among Staff Nurses of Tertiary Care Hospital in Delhi

Dr. Gurmeet Kaur<sup>1</sup>, Priya Arora<sup>2</sup>, Tanu Anand<sup>3</sup> and Rajesh Vaidya<sup>4</sup>

<sup>1</sup> Guru Gobind Singh Indraprastha University

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## Abstract

Stress related diseases are ubiquitous around the world and a lot of people are disabled due to stress. Stress is the psychological and physiological response to threatening and unpleasant environmental factors. (1) Occupational Stress is the result of the interaction between the individual and the work environment. (2) Occupational stress is a risk factor for depressive symptoms. (3,4) Factors such as extensive work overload, lack of autonomy, long working hours, abusive management, bad relationship with coworkers, lack of equal opportunities have been identified in stress related to workplace. (5) Factors contributing to stress at workplace include physical agents (light, sound, heat or cold), occupational factors (workload, ambiguity and job problems, changes, pressure about time saving, taking responsibility too low or too high), factors related to organizational management (lack of organizational support, structural weakness, poor management), synergistic factors (lack of solidarity, weak group support), factors associated with individual expectations (hopes and early expectations, retirement concerns), and factors outside the work environment (family life, marriage, parents, finances, friends and community relations). (6-8)

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## Index terms—

## 1 Introduction

Stress related diseases are ubiquitous around the world and a lot of people are disabled due to stress. Stress is the psychological and physiological response to threatening and unpleasant environmental factors. (1) Occupational Stress is the result of the interaction between the individual and the work environment. (2) Occupational stress is a risk factor for depressive symptoms. (3,4) Factors such as extensive work overload, lack of autonomy, long working hours, abusive management, bad relationship with coworkers, lack of equal opportunities have been identified in stress related to workplace. (5) Factors contributing to stress at workplace include physical agents (light, sound, heat or cold), occupational factors (workload, ambiguity and job problems, changes, pressure about time saving, taking responsibility too low or too high), factors related to organizational management (lack of organizational support, structural weakness, poor management), synergistic factors (lack of solidarity, weak group support), factors associated with individual expectations (hopes and early expectations, retirement concerns), and factors outside the work environment (family life, marriage, parents, finances, friends and community relations). (6)(7)(8) Among various professions, nursing profession is one which gives immense satisfaction and accomplishment. But, often it can also be enormously stressful. In India the nurse to patient ratio is considerably low (1:2250) thereby overstraining of nurses often occurs. (9) There is mounting evidence that the physical work environment affects job performance, job satisfaction, employee injuries, worker behaviors, communication patterns, employee fatigue, employee error rates, and physical and psychological stress. (10) Environmental factors such as noise, air quality,

light, toxic exposures, temperature, humidity, and aesthetics have been identified as possible risk factors for stress at workplace. (11) There is evidence showing nurses are adversely affected by high noise levels. Such levels have been associated with increased stress and annoyance, fatigue, emotional exhaustion, and burnout. Increased feelings of noise-related stress and burnout can lead to an increase in intention to change profession. (12) Nurses across the world are reporting such increased stress and dissatisfaction with their jobs (13) and job-related stress in the work environment being one of the principal reasons that nurses change jobs. Studies reveal that combination of environmental factors with the growing patient's demand for safety, security, competence, physical and psychological comfort are responsible behind the mounting stress levels among nurses. (14) Thus this study was planned in order to assess the stress due to physical environment & job requirements among staff nurses of a tertiary care hospital in Delhi. It will help in rationalizing the stress management initiatives towards a definite course, thereby warranting that health care givers remain healthy and stress free which will lead to efficient delivery and improved quality of health services for the population at large.

## 2 II.

### 3 Methodology a) Study Setting and Study Participants

This was a hospital based cross-sectional study carried out among nursing personnel in a tertiary care hospital catering to a large population of Delhi and nearby states. Out of the total 2190 staff nurses and nursing sisters (junior nursing staff), 102 randomly selected nursing personnel, aged between 18 years to 60 years who were working in the hospital for at least 1 year, were free from physical disease, no history of neurological or psychiatric diseases and no drug addiction were included in the study. This sample was calculated on the basis of expected prevalence of stress among nurses, which was 60% (15), worst acceptable prevalence was taken as 50% with a 95% confidence interval. Nurses were also stratified according to their joining date in order to achieve adequate randomization. They were further randomized according to their workstation consisting of 50 beds. From each workstation, participants were selected using a random numbers' table. Informed consents were obtained before getting their personalized responses.

### 4 b) Study Tool

A pretested, self-administered, structured questionnaire was used for data collection. It included items to record socio-demographic characteristics and assess the presence of factors regarding stress among the nursing personnel. The questionnaire contained items to assess stress due to physical environment and job requirements and its associated factors which is issued by The National Institute for Occupational Safety and Health (NIOSH). The questionnaire is a screening tool for identifying the stressors at work leading to stress. Questions to assess Stress among Nurses working in tertiary care hospitals along with their socio-demographic profile and job specifications were included based on a literature review. (16) The questionnaire was reviewed for suitability, relevance and accuracy in the Indian context. It was pretested in the English language with ten staff nurses and was suitably modified by removing 10 questions which were not relevant to objective of study and study settings. Internal consistencies of the items on Stress due to Physical Environment and job requirements were obtained through a Cronbach's alpha coefficient (0.90). The questionnaire was divided into 3 sections. The first section consisted of 4 questions pertaining to the socio demographic profile of nurses. The second section consisted of General Job Information including work experience, job title, job situation, work shift and rotation patterns and the third section consisted of 16 questions to assess for work situation associated with stress due to physical environment (Noise, lighting, temperature, humidity, air circulation and pollution) and job requirements (working fast, working hard, thinking fast, little time, workload, concentration etc).

The degree and quantification of stress due to physical environment and job requirements was assessed by a scoring system based on the 5 point 'Likert Scale' such as: 1. Rarely (Classified as No Stress); 2. Occasionally (Mild Stress); 3. Sometimes (Moderate Stress); 4. Fairly often (Severe Stress); 5. Very often (Extreme Stress). The questionnaire contained 10 possible conditions that may act as sources of stress in their day-to-day life due to physical environment and 10 possible conditions that may act as sources of stress due to job requirements and nurses were asked to grade them on a scale of 1 to 5. The scores given by each nurse to all the given stressors in their daily life were then summed up to obtain a stress score for each participant. The minimum score that could be obtained by each nurse would be 10 (10 X 1) and maximum would be 50 (10X 5). On the basis of this score, the stress in everyday life of nurse was classified as: no stress: 10, mild stress: 11 to 20, moderate stress: 21 to 30, severe stress: 31 to 40 and Extreme Stress: 41 to 50. Individual score for each stressor was also calculated by summing the score given by each nurse to a single stressor. Therefore for each stressful condition, the minimum score obtained was (1 X 10) '10' and the maximum score was (5X10) '50'. This was done to determine what sources were most significant contributors to stress in nurses' lives due to physical environment and job requirements.

### 5 c) Survey Procedure

Questionnaires were distributed to the study subjects after obtaining written informed consent. The subjects were given between 15 and 30 minutes to complete the questionnaires. The questionnaires were scrutinized at

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the time of collection and if any information was missing, nurses were asked again for that information to be completed.

## 6 d) Analysis

Data were entered in Microsoft Excel and transferred into SPSS version 17 for analysis. Findings were presented as group proportions, and difference in proportions for a given factor was assessed by the Chi-square test. A P value cut off for statistical significance was set at 0.05. Factors which were significantly associated ( $P < 0.05$ ) with stress due to physical environment and job requirements in univariate analysis, were further analyzed in Binomial Logistic regression analysis. Odds Ratios (ORs) were calculated indicating the relative odds of occurrence of stress due to physical environment and job requirements due to the presence of a particular factor.

## 7 e) Ethical Issues

All nursing staff who participated in the study were informed about the purpose of the study and full free and voluntary consent was taken before their inclusion. Each nurse who participated in the study was free to withdraw from the study at any point in time and was ensured confidentiality of the responses. The study was approved by the institutional ethics committee of the medical college.

## 8 III.

## 9 Results

Table 1 shows the characteristics of sociodemographic profile and job profile of nurses. Out of the total 102 nurses, 80% of nurses were females and 98% were married. The mean age of the study group was 38.52 (7.107). Mean age of nurses found with severe stress included 39.67 years. Mean work duration per week is 49.90 (7.976) hours. Mean work experience in this profession was 16.40 (5.880) years and with the present employer is 4.57 (1.680) years.

Out of the total 75.5% were full time permanent employee and 38.2% had permanent day shift. All the nurses (100%) found their jobs stressful with 57.7% reporting moderate stress while 42.1% reported severe stress.

Table 2 shows stressors of physical environment in which 80% disagreed that temperature in summers was comfortable while 72.5% disagreed that air circulation in work area was good and 54.9% disagreed that they are protected well from dangerous substances. 54.9% agreed that overall quality of physical environment was poor of their workplace while 85.3% disagreed that lighting was inadequate at their work place.

As per the stress due to job requirements shown in (Table 3), 79.4% said often their work requires marked increase in concentration while 63.7% reported they have to often work very hard. 75.5% said they have to work fast in their job quite often while 76.5% said there is often marked increase in their workload. Out of the given possible sources of stress in nurses' everyday life, 'Inability to use skills from previous experience and training' was considered the most stressful whereas stressful. (Table 4).

On univariate analysis (Table 5) the possible stressors associated with physical environment and job requirements include air in work area, thinking fast, temperature in winters, temperature in summers, humidity, air circulation and quality of physical environment which were all found to be statistically significant ( $<0.05$ ).

To understand the co-association of various risk factors in the current occurrence of stress due to physical environment and job requirements among nurses, logistic regression analysis was done. The outcome variable was physical environment as good or bad. The Binary Logistic regression analysis using LR backward likelihood ratio showed the model was statistically significant,  $p < 0.005$  consisting of factors like humidity, temperature in summer, thinking fast and quality of physical environment, temperature in winter and air circulation in work area. The model explained 41.1% (Nagelkerke  $R^2$ ) of the variance in stress with physical environment and correctly classified 73.5% of nurses. Among all the factors humidity, temperature in summer, thinking fast and quality of physical environment were found to be associated for stress due to physical environment which was proven with statistical significance ( $p$  value  $<0.01$ )

IV.

## 10 Discussion

This study showed that majority of nurses 98% were married and 80% were females. Although there is no statistical significance, married nurses were found being more stressed than those who were unmarried. This could suggest that the additional responsibility of married life may increase their stress levels. On contrary to our findings Gelsema et al (17) noted that married nurses' experienced lower stress than unmarried nurses and female nurses experienced lower stress than men. Hence, to ascertain the association between marital status and stress further studies are required.

It was found in our study that with increasing age more nurses were stressed although increasing age and longer duration of the job did not have a statistically significant relationship with job stress. However other studies have demonstrated that increasing age and longer duration of job lead to increased stress. (18) (19) In our study 75.5% nurses agreed that they have to often work very fast which is consistent with findings of Zhou et al (20) that showed that time pressures was significantly correlated with job stress.

All the nurses reported stress in the present study. However, the very high levels of work stress was found in 57.7% nurses, which is similar to a survey conducted in 2013 among Nigerian nurses, where 56.3% of nurses reported 'high work stress'.

Other studies have also found a similar stress levels. (21), (22) No statistically significant difference was found between stress levels in this hospital, thereby suggesting that stress levels are not influenced by the type of hospital and stress management programmes should focus on nursing occupation holistically irrespective of type of setting.

The results showed a significant relationship between physical environment and job requirements on one hand and stress experienced by the nurses on the other hand. This is consistent with Shakerinia and Mohammadpour study (23) on the stressor effect of work environment on nurses who reported that more than 90% of the nurses regularly experienced stressful environment.

About half (51%) of the nurses in our study agreed noise was usually high in their work place, 40% said workplace is crowded and 54.9% nurses reported poor quality of work environment, which are consistent with findings of Montano et al. (24) and Nadri et al (25) who found that stress status of the employees was high especially when the physical environment in the workplace, such as light, noise, ventilation and chemical agents were assessed along with small work environment.

A study in 2013 on stressors of work environment of nurses showed that 93% of the respondents regularly experienced stressors at work. (26) These findings were consistent with our study. Potential capabilities of the employees must be realized and people must be assigned with a proper job in decent environment. Moreover, assigning unbearable responsibilities is not defensible. Indices introduced in the study must be controlled periodically to evaluate and determine effective managerial functions to reduce job stress.

### 11 a) Limitations of the study

One of the limitations of the study was that since stress had no objective definition or criteria; hence different subjects may have interpreted it differently. Only a limited domain of stress was determined as the goal of study was broad based and descriptive. Although stratification was done to achieve equal representation from all workstations, the sample size of 102 may not reflect the true situation. Moreover, results firmly believe that the above limitations have not defeated the purpose of the study.

V.

## 12 Conclusion

This study has provided an insight into the problem of occupational stress amongst nurses due to physical environment and job requirements and deciphered the factors responsible for the same. It has also attempted to establish a hierarchy of priority, with which the stressors operational in the nurses' life as well as occupation should be tackled in stress management programmes. This should give a proper direction and aid in designing of an efficient stress management programmes for them. These findings may go a long way in improving the mental health and stress levels of nurses and thereby enabling them to provide better patient care. <sup>1</sup>

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Gender	Male Female	19.6% 80.4%
Marital status	Married Unmarried	98% 02%
Age	25-40 years 41-60 years	62.7% 37.3%
Children	Less than 2 More than 2	88.2% 9.8%
Work experience with present employer	Less than 5 years	50%
	More than 5 years	50.1%
Job title	Staff Nurse Nursing sisters	81.3% 18.6%
Overall work experience	Less than 20 years More than 20 years	76.6% 15.8%
Job situation	Permanent employee Temporary employee	83.3% 16.7%
Work Shift	Permanent Rotating	67.6% 32.3%
Working in this shift **	Less than 2 years More than 2 years	31.4% 68.6%
Work duration per week	25-45 hrs 46-68 hrs	23.9% 76.1%

\* 34.3% rotated in no set pattern while 30% rotated in 8hour shift Night to evening to Day.

\*\*27.5% agreed they changed their shift twice a week and 24.5% agreed they changed their shift more than twice a week.

Figure 1: Table 1 :

2

N %

Figure 2: Table 2 :

3

N %

Figure 3: Table 3 :

4

Possible job requirements leading to stress	Degree of Stress: 1=No stress and 5= Extreme stress				Total stress score for this source	Percent score of the highest stress
	1 n (%)	2 n (%)	3 n (%)	4 n (%)	5 n (%)	
How often does your job require you to work very fast?	2 (1.9)	23 (22.5)	41 (40.2)	27 (26.5)	9 (8.8)	324 63.5
How often does your job require you to work very hard?	7 (6.9)	30 (29.4)	42 (41.2)	18 (17.6)	5 (4.9)	290 56.9
How often does your job leave you with little time to get things done?	8 (7.8)	34 (33.3)	38 (37.3)	17 (16.7)	5 (4.9)	283 55.5
How often is there a great deal to be done?	13(12.7)	21(20.6)	41 (40.2)	21 (20.6)	6 (5.9)	292 57.2

Figure 4: Table 4 :

5

Univariate Analysis			
	OR	95% CI	P value
Air in my work area	3.32	1.46-7.54	<0.05
Noise	0.85	0.39-1.86	>0.05
Temperature in summer	0.30	0.10-0.90	<0.05
Protection from Dangerous substances	1.05	0.48-2.31	>0.05
Work very fast	0.68	0.27-1.71	>0.05
work very hard	0.46	0.20-1.06	>0.05
Little time	0.88	0.40-1.94	>0.05
Great deal of work	1.00	0.43-2.28	>0.05
workload	0.93	0.37-2.34	>0.05
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Figure 5: Table 5 :

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## 12 CONCLUSION

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