

¹ Self Rated Assessment of Stress due to Physical Environment &
² Job Requirements among Staff Nurses of Tertiary Care Hospital
³ in Delhi

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⁷

⁸ **Abstract**

⁹ Stress related diseases are ubiquitous around the world and a lot of people are disabled due to
¹⁰ stress. Stress is the psychological and physiological response to threatening and unpleasant
¹¹ environmental factors.(1) Occupational Stress is the result of the interaction between the
¹² individual and the work environment.(2) Occupational stress is a risk factor for depressive
¹³ symptoms.(3,4) Factors such as extensive work overload, lack of autonomy, long working
¹⁴ hours, abusive management, bad relationship with coworkers, lack of equal opportunities have
¹⁵ been identified in stress related to workplace.(5) Factors contributing to stress at workplace
¹⁶ include physical agents (light, sound, heat or cold), occupational factors (workload, ambiguity
¹⁷ and job problems, changes , pressure about time saving, taking responsibility too low or too
¹⁸ high), factors related to organizational management (lack of organizational support, structural
¹⁹ weakness, poor management), synergistic factors (lack of solidarity, weak group support),
²⁰ factors associated with individual expectations (hopes and early expectations, retirement
²¹ concerns), and factors outside the work environment (family life, marriage, parents, finances,
²² friends and community relations).(6-8)

²³

²⁴ *Index terms—*

²⁵ **1 Introduction**

²⁶ Stress related diseases are ubiquitous around the world and a lot of people are disabled due to stress. Stress is the
²⁷ psychological and physiological response to threatening and unpleasant environmental factors. (1) Occupational
²⁸ Stress is the result of the interaction between the individual and the work environment. (2) Occupational stress is a
²⁹ risk factor for depressive symptoms. (3,4) Factors such as extensive work overload, lack of autonomy, long working
³⁰ hours, abusive management, bad relationship with coworkers, lack of equal opportunities have been identified in
³¹ stress related to workplace. (5) Factors contributing to stress at workplace include physical agents (light, sound,
³² heat or cold), occupational factors (workload, ambiguity and job problems, changes , pressure about time saving,
³³ taking responsibility too low or too high), factors related to organizational management (lack of organizational
³⁴ support, structural weakness, poor management), synergistic factors (lack of solidarity, weak group support),
³⁵ factors associated with individual expectations (hopes and early expectations, retirement concerns), and factors
³⁶ outside the work environment (family life, marriage, parents, finances, friends and community relations). (6)(7)(8)
³⁷ Among various professions, nursing profession is one which gives immense satisfaction and accomplishment. But,
³⁸ often it can also be enormously stressful. In India the nurse to patient ratio is considerably low (1:2250) thereby
³⁹ overstraining of nurses often occurs. (9) There is mounting evidence that the physical work environment affects
⁴⁰ job performance, job satisfaction, employee injuries, worker behaviors, communication patterns, employee fatigue,
⁴¹ employee error rates, and physical and psychological stress. (10) Environmental factors such as noise, air quality,

5 C) SURVEY PROCEDURE

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

54 2 II.

55 3 Methodology a) Study Setting and Study Participants

56 This was a hospital based cross-sectional study carried out among nursing personnel in a tertiary care hospital
57 catering to a large population of Delhi and nearby states. Out of the total 2190 staff nurses and nursing sisters
58 (junior nursing staff), 102 randomly selected nursing personnel, aged between 18 years to 60 years who were
59 working in the hospital for at least 1 year, were free from physical disease, no history of neurological or psychiatric
60 diseases and no drug addiction were included in the study. This sample was calculated on the basis of expected
61 prevalence of stress among nurses, which was 60% (15), worst acceptable prevalence was taken as 50% with a
62 95% confidence interval. Nurses were also stratified according to their joining date in order to achieve adequate
63 randomization. They were further randomized according to their workstation consisting of 50 beds. From each
64 workstation, participants were selected using a random numbers' table. Informed consents were obtained before
65 getting their personalized responses.

66 4 b) Study Tool

67 A pretested, self-administered, structured questionnaire was used for data collection. It included items to record
68 socio-demographic characteristics and assess the presence of factors regarding stress among the nursing personnel.
69 The questionnaire contained items to assess stress due to physical environment and job requirements and its
70 associated factors which is issued by The National Institute for Occupational Safety and Health (NIOSH). The
71 questionnaire is a screening tool for identifying the stressors at work leading to stress. Questions to assess Stress
72 among Nurses working in tertiary care hospitals along with their socio-demographic profile and job specifications
73 were included based on a literature review. ??16) The questionnaire was reviewed for suitability, relevance and
74 accuracy in the Indian context. It was pretested in the English language with ten staff nurses and was suitably
75 modified by removing 10 questions which were not relevant to objective of study and study settings. Internal
76 consistencies of the items on Stress due to Physical Environment and job requirements were obtained through a
77 Cronbach's alpha coefficient (0.90). The questionnaire was divided into 3 sections. The first section consisted of
78 4 questions pertaining to the socio demographic profile of nurses. The second section consisted of General Job
79 Information including work experience, job title, job situation, work shift and rotation patterns and the third
80 section consisted of 16 questions to assess for work situation associated with stress due to physical environment
81 (Noise, lighting, temperature, humidity, air circulation and pollution) and job requirements (working fast, working
82 hard, thinking fast, little time, workload, concentration etc).

83 The degree and quantification of stress due to physical environment and job requirements was assessed by a
84 scoring system based on the 5 point 'Likert Scale' such as: 1. Rarely (Classified as No Stress); 2. Occasionally
85 (Mild Stress); 3. Sometimes (Moderate Stress); 4. Fairly often (Severe Stress); 5. Very often (Extreme Stress).
86 The questionnaire contained 10 possible conditions that may act as sources of stress in their day-to-day life due
87 to physical environment and 10 possible conditions that may act as sources of stress due to job requirements and
88 nurses were asked to grade them on a scale of 1 to 5. The scores given by each nurse to all the given stressors
89 in their daily life were then summed up to obtain a stress score for each participant. The minimum score that
90 could be obtained by each nurse would be 10 (10 X 1) and maximum would be 50 (10X 5). On the basis of
91 this score, the stress in everyday life of nurse was classified as: no stress: 10, mild stress: 11 to 20, moderate
92 stress: 21 to 30, severe stress: 31 to 40 and Extreme Stress: 41 to 50. Individual score for each stressor was also
93 calculated by summing the score given by each nurse to a single stressor. Therefore for each stressful condition,
94 the minimum score obtained was (1 X 102) '102' and the maximum score was (5X102) '510'. This was done to
95 determine what sources were most significant contributors to stress in nurses' lives due to physical environment
96 and job requirements.

97 5 c) Survey Procedure

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

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

102 **6 d) Analysis**

103 Data were entered in Microsoft Excel and transferred into SPSS version 17 for analysis. Findings were presented
104 as group proportions, and difference in proportions for a given factor was assessed by the Chi-square test. A
105 P value cut off for statistical significance was set at 0.05. Factors which were significantly associated ($P <$
106 0.05) with stress due to physical environment and job requirements in univariate analysis, were further analyzed
107 in Binomial Logistic regression analysis. Odds Ratios (ORs) were calculated indicating the relative odds of
108 occurrence of stress due to physical environment and job requirements due to the presence of a particular factor.

109 **7 e) Ethical Issues**

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

114 **8 III.**

115 **9 Results**

116 Table 1 shows the characteristics of sociodemographic profile and job profile of nurses. Out of the total 102
117 nurses, 80% of nurses were females and 98% were married. The mean age of the study group was 38.52 (7.107).
118 Mean age of nurses found with severe stress included 39.67 years. Mean work duration per week is 49.90 (7.976)
119 hours. Mean work experience in this profession was 16.40 (5.880) years and with the present employer is 4.57
120 (1.680) years.

121 Out of the total 75.5% were full time permanent employee and 38.2% had permanent day shift. All the nurses
122 (100%) found their jobs stressful with 57.7% reporting moderate stress while 42.1% reported severe stress.

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

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

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

135 To understand the co-association of various risk factors in the current occurrence of stress due to physical
136 environment and job requirements among nurses, logistic regression analysis was done. The outcome variable
137 was physical environment as good or bad. The Binary Logistic regression analysis using LR backward likelihood
138 ratio showed the model was statistically significant, $p < 0.005$ consisting of factors like humidity, temperature in
139 summer, thinking fast and quality of physical environment, temperature in winter and air circulation in work area.
140 The model explained 41.1% (Nagelkerke R²) of the variance in stress with physical environment and correctly
141 classified 73.5% of nurses. Among all the factors humidity, temperature in summer, thinking fast and quality of
142 physical environment were found to be associated for stress due to physical environment which was proven with
143 statistical significance (p value <0.01)

144 IV.

145 **10 Discussion**

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

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

12 CONCLUSION

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

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

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

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

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

178 11 a) Limitations of the study

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

184 V.

185 12 Conclusion

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

1

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	%
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Figure 2: Table 2 :

3

N	%
---	---

Figure 3: Table 3 :

12 CONCLUSION

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	3		
	n	n	n	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
Bibliography			

Figure 5: Table 5 :

192 [Habibollah (2006)] 'A Study of Depression Prevalence in Nurses and It's Effect in Shiraz Namazi'. K Habibollah
193 . *Hospital Middle East Journal Of Family Medicine* 2006 Jul. 4 (3) p. .

194 [Lambert et al. ()] 'Crosscultural comparison of workplace stressors, ways of coping and demographic character-
195 istics as predictors of physical and mental health among hospital nurses in Japan, Thailand, South Korea
196 and the USA (Hawaii)'. V A Lambert , C E Lambert , J Itano . *Int J Nurs Stud* 2004. 41 p. .

197 [Montano et al. ()] 'Effects of organisational-level interventions at work on employees' health: a systematic
198 review'. D Montano , H Hoven , J Siegrist . *BMC Public Health* 2014. 14 p. 135.

199 [Seifert and Hickman (2005)] *Enhancing patient safety in a healing environment*, P C Seifert , D S Hickman .
200 <http://www.medscape.com/viewarticle/499690> Mar. 2005. August 17. 2016. (serial online)

201 [Golshiri et al. ()] 'Factors effective on job stress of nurses working in emergency wards'. P Golshiri , S Pourabedian
202 , A Najimi , Mosa Zadeh , H Hasheminia , J . *Health Syst Res* 2013. 9 (1) p. .

203 [Shader et al. ()] 'Factors influencing satisfaction and anticipated turnover for nurses in an academic medical
204 center'. K Shader , M Broome , C Broome , M West , M Nash . *J Nurs Adm* 2001. 31 p. . (Pub Med:
205 11324334)

206 [Kozier et al. ()] *Fundamentals of nursing concepts*, B Kozier , G Erb , A Berman , S Snyder . 2004. USA:
207 Pearson Education Inc. (process and practice, 7 th edition)

208 [Georgia Nurses Association staffing survey validates national survey Georgia Nursing (2011)] 'Georgia Nurses
209 Association staffing survey validates national survey'. <http://findarticles.com> Georgia Nursing Aug-
210 Oct 2011p. (Accessed on 21.9.2016)

211 [Stichler ()] 'Healthy, healthful, and healing environments. A nursing perspective'. J Stichler . *Crit Care Nurs Q*
212 2009. 32 (3) p. . (Pub Med: 19542969)

213 [Leka et al. ()] 'Investigating the impact of psychosocial risks and occupational stress on psychiatric hospital
214 nurses' mental wellbeing in Japan'. S Leka , J Hassard , A Yanagida . *Journal of Psychiatric and Mental
215 Health Nursing* 2012. 19 p. .

216 [Park et al. ()] 'Job stress and depressive symptoms among Korean employees: the effects of culture on work'. S
217 G Park , K B Min , S J Chang . *International Archives of Occupational and Environmental health* 2009. 82
218 p. .

219 [Gelserma et al. ()] 'Job stress in the nursing profession: The influence of organizational and environmental
220 conditions and job characteristics'. T I Gelserma , M Van Der Doef , S Maes , S Akerboom , Verhoeven
221 Ch . *Int J Stress Manag* 2005. 12 (3) p. .

222 [Nakata et al. ()] 'Job stress, social support at work, and insomnia in Japanese shift workers'. A Nakata , T
223 Haratani , M Takahashi . *Journal of Human Ergology* 2001. 30 p. .

224 [Opie et al. ()] 'Levels of occupational stress in the remote area nursing workforce'. T Opie , M Dollard , S
225 Lenthall . *Aust J Rural Health* 2010. 18 p. .

226 [Clegg ()] 'Occupational stress in nursing: a review of the literature'. A Clegg . *Journal of Nursing Management*
227 2001. 9 p. .

228 [Olayinka et al. ()] 'Occupational stress management among nurses in selected hospital in Benin city, Edo state,
229 Nigeria'. Onasoga Olayinka , A , Ogbefor Sarah Osamudiamen , . A Ojo . *Euro. J. Exp. Bio* 2013. 3 (1) p. .

230 [Shakerinia and Mohammadpour ()] 'Relationship between job stress and resiliency with occupational burnout
231 among nurses'. I Shakerinia , M Mohammadpour . *Behbood J* 2010. 14 (2) p. .

232 [Joseph and Ulrich (2007)] *Sound control for improved outcomes in healthcare settings. Concord, C A: The Center
233 for Health Design*, A Joseph , R Ulrich . <http://www.healthdesign.org/research/reports/sound.php> 2007. Accessed August 31. 2016.

235 [The effect of health care working conditions on patient safety. Evidence Based Report/Technology Assessment (2003)]
236 *The effect of health care working conditions on patient safety. Evidence Based Report/Technology Assessment*,
237 <http://www.ahrq.gov/clinic/epcsums/worksuum.htm> 2003. Accessed August 17. 2016. Agency for
238 Healthcare Research and Quality (AHRQ (AHRQ Publication 03-E024. Available at)

239 [Nadri et al. ()] 'The job stress among tellers and its affecting factors'. F Nadri , A Nadri , F Nadri , E Haidari
240 , H Akbari , H Akbari . *Journal of Health Policy and Sustainable Health* 2014. 1 (2) p. .

241 [Zhou et al. ()] 'The relationship among role conflict, role ambiguity, role overload and job stress of chinese
242 middle-level cadres'. Y Zhou , W Zeng , Y Hu , Y Xi , L Tan . *Chinese Studies* 2014. 3 (1) p. .

243 [Landa et al. ()] 'The relationship between emotional intelligence, occupational stress and health in nurses: a
244 questionnaire survey'. Augusto Landa , J M Lopez-Zafra , E Martos , M P , Aguilar-Luzon Mdel , C . *Int J
245 Nurs Stud* 2008. 45 (6) p. .

246 [Pikó ()] 'Work-related stress among nurses: a challenge for health care institutions'. B Pikó . *The Journal of the
247 Royal Society for the Promotion of Health* 1999. 119 (3) p. .

12 CONCLUSION

248 [Colligan and Higgins ()] 'Workplace Stress: Etiology and Consequences'. T W Colligan , E Higgins . *Journal of*
249 *Workplace Behavioral Health* 2005. 21 p. .

250 [Lambert et al. ()] 'Workplace stressors, ways of coping and demographic characteristics as predictors of physical
251 and mental health of Japanese hospital nurses'. V A Lambert , C E Lambert , M Ito . *Int J Nurs Stud* 2004.
252 41 p. .