A Cross-Sectional Study to Assess Relation Between Behavioural Risk Factors and Body Mass Index with Professional Stress among Staff nurses of a Tertiary care Hospital of Mumbai

Dhanashree Khade[1], Shalini Rawat[2], Taheseen Fatema Shaikh[3], Seema S Bansode Gokhe[4]

[1]Assistant Professor, Department of Community Medicine, Rajiv Gandhi Medical College,Thane, Maharashtra, India
[2]Assistant Professor, Department of Community Medicine, Government Doon Medical College, Dehradun, Uttarakhand, India
[3]Assistant Professor, [4]Professor & Head, Department of Community Medicine, LTMMC & GH Sion Hospital, Mumbai, Maharashtra, India
Correspondence: Dr. Dhanashree Khade, Email: dhanashreekhade92@gmail.com

Abstract:

Introduction: Work-related stressors may influence ability of nurses to engage in regular exercise and maintain positive dietary behavior. Lack of time was considered as the main barrier to being physically active. This supports suggestions that work related stressors like shift work and long working hours may lead to a neglect of physical activity needs in the nursing professionand is associated with other negative health behavior. **Objective:** To assess relation between Behavioral risk factors and Body Mass Index with Professional Stress among staff nurses of Tertiary care Hospital having Shift duties. **Method:** Descriptive Cross-sectional study conducted among staff nurses of age group 25 years and above of a Tertiary cares Hospital in Mumbai. The sample size obtained through multi stage sampling was 187. Data was collected with help of pre-tested pre-designed questionnaire by interview method. Professional Stress Scale by David Fontanna (DFPS) was used for evaluating Occupational stress. **Results:** Mean age of staff nurses was 40.05±11.53 years. Mean score of DFPS was 14.65 ± 5.52. Out of 187 staff nurses, 65.77% were not in normal BMI range of which maximum were in pre-obese (28.34%) followed by underweight (16.04%) and overweight (16.04%) category. Associations of BMI, dietary habits, physical activity and on continuous medication for chronic diseases with professional stress among staff nurses were statistically significant (p<0.005). **Conclusion:** Behavioral risk factors like Body Mass Index, irregular intake of meals, lack of physical activity, continuous medications have impact on professional stress of staff nurses.

Keywords: Behavioural risk factors, Body Mass Index, Lifestyle risk factors, Professional stress, Staff Nurses

Introduction:

The workplace is defined as an environment in which workers and managers collaborate to promote the health and wellbeing of all workers.[1] Also, the worksite is internationally recognized as an appropriate setting for health promotion and disease prevention as this is where working individuals could spend up to 60% of their waking hours.[2,3] Employees including nurses are at increased risk of non-communicable diseases (NCDs) like diabetes, hypertension and coronary heart diseases (CHD).[4] The main risks of NCDs are physical inactivity, unhealthy eating, smoking and alcohol abuse.[5] The World Health Organization defined health as a state of complete physical, mental, and social well-being and not merely the absence of disease.[6]

Physical health incorporates physical activity, nutrition, and recovery. While the recommendation

of 150-300 minutes per week of moderate intensity physical activity on most days of the week is required to maintain health, it has been reported that not all health care workers are meeting this minimum requirement.[7,8] High prevalence of overweight and obesity has been reported in health care workers.[9] Work-related stressors may influence the ability of nurses to engage in regular exercise and maintain positive dietary behavior. Lack of time was considered as the main barrier to being physically active. This supports suggestions in the literature that work related stressors, such as shift work and long working hours, may lead to a neglect of physical activity needs in the nursing profession,[10-12] and this is worrying because low levels of physical activity have been associated with other negative health behavior.[13]

Poor diet and low levels of physical activity are known risk factors for overweight and obesity.[14] Reported prevalence of overweight and obesity among nurses internationally ranges between 54.5% and 79.1%.[15-18] The shift work of nurses has been found to increase their health problems. It disrupts regular sleep, eating and exercise habits, potentially making it more difficult to maintain a healthy weight.[19] Additionally, research has shown that nurses regularly consume foods that are high in fat and sugar content, which has been associated with time pressure and shift work patterns in the nursing occupation.[20-22] Therefore, the main aim of this research study was to access the relationship between the current lifestyle behaviors such as physical activity, obesity, lifelong medications for chronic diseases as important modifiable risk factors in development of professional stress among staff nurses of a Tertiary Care Hospital.

Method:

An Observational Descriptive study, cross-sectional in design was conducted among staff nurses of age group 25 years and above as per inclusion criteria of work experience of staff nurses from a Tertiary care Hospital in a metropolitan city of Maharashtra from April 2018 to November 2019. Multistage sampling was done and calculated sample size was 187.

The study subjects were divided into three groups i.e Morning shift, Evening shift and Night shift. The proportion of staff nurses in each group was 2:1:1 respectively in the field practice area. Therefore, sample size was divided into 4 parts. i.e., 186/4= 46.5. Therefore, 1 part would be 46.5 which is approximately 47. Multistage sampling was done and sample size was 187.The study subjects were divided into three groups i.e Morning shift, Evening shift and Night shift. The proportion of staff nurses in each group was 2:1:1 respectively in the field practice area.

The sample size was divided into 4 parts. i.e. 186/4= 46.5. Therefore, 1 part would be 46.5, which is approximately 47. So, the sample size would include 93 staff nurses from morning duty shift group and 47 each from evening and night duty shift groups. The study was approved by the institutional Ethics Committee. Informed consent was taken from study subjects. Staff nurses were identified based on their duty patterns, i.e. Single shift duty (morning shift only), Two shift duty (having morning and evening shifts) and Circle or three shift duty (having all morning, evening and night shifts). Staff nurses from each duty patterns were approached after seeking permission from the Matron.

The data was collected by interview method with the help of questionnaire which was designed by authors and tested by professors of psychiatry and community medicine department of the same institute. The questionnaire consisted of socio-demographic data of staff nurses along with their personal lifestyle, behavior and occupational history. Professional Stress Scale by David Fontana (DFPS) which is validated for use in India[23] was used for evaluating Occupational stress among nurses. The DFPS scale is adapted from Managing Stress,the British Psychological Society and Routledge Ltd, Leicester, England, 1989.[24] It consists of 24 questions covering different variables like personality perception by others, optimism for life, satisfaction to self and work, adjustment with the professional environment, and so on. A total score is 60. The score is interpreted as 0-15, no stress; 16-30, moderate stress; 31-45, severe stress and 45-60 stress as major

problem and SOS action needs to be taken.[24] Data analysis was done using SPSS version.20 software and Microsoft excel software.

Operational Definitions:

1. Dietary Habit: Habitual decisions and patterns related to food consumption, including what, when, and how much a person eats in a day. Regular habits will include person consuming meals at fixed times of day as per their calorie and protein requirement.

2. Any Physical Activity: Bodily movements produced by skeletal muscles that requires energy expenditure other than movements done for duty work and household chores. This includes a wide range of activities like walking, gardening, running to structured exercise routines and sports.

3. Addiction (Any): Compulsive seeking and use of a substance or engagement in a behavior despite knowing harmful consequences of the

substance. It involves physical and psychological dependence, where the individual may experience cravings and withdrawal symptoms when the substance or behavior is not available.

Results:

Table 1 described the demographic details and professional details of study sample like years of experience, job rank and type of duty they are doing. The mean score of DFPS in the study population was 14.65 ± 5.52. Of 187 nurses 102 (54.54%) had no stress while 84 (44.91%) had moderates stress and only one had severe stress. Mean age of staff nurses was 40.05 ± 11.53 (24-58).

Table 2 showed association of Nutritional Status (Classification of Weight) of Staff nurses according to BMI (WHO Cut-off for Asians) with professional stress of study population.[25] It was observed that the majority of staff nurses (65.77%) did not have BMI values within the normal range.

Table 1: Demographic and professional details of study population (N=187)

Parameter		Mean ± S.D./ n (%)
Age (in years)		40.05 ± 11.53 (24-58)
Religion	Hindu	164 (87.70%)
	Non- Hindu	23 (12.30%)
Marital Status	Married	146 (78.07%)
	Single (Divorced/Separated/Unmarried)	41 (21.92%)
Type of Family	Nuclear	132 (70.6%)
	Joint	55 (29.4%)
Socio- economic class as per Modified Kuppuswami Scale for Urban population	Upper Class	91 (48.7%)
	Upper Middle Class	96 (51.3%)
Years of Work Experience		17.91 ± 10.86 (5-35)
Job Rank	Sister in charge	16 (8.60%)
	Senior Staff	27 (14.40%)
	Duty Staff	144 (77.0%)
Type of Duty	Circle/Three Shift Duty	98 (52.40%)
	Two Shift Duty	35 (18.71%)
	Straight/ Single Shift Duty	54 (28.87%)

Table 2: Association of Nutritional Status (Classification of Weight) of Staff nurses according to BMI with professional stress of study population (N=187)

DFPS score Interpretation n (%)	Classification of Nutritional Status (Weight) of Staff Nurses according to WHO criteria for BMI cut-off for Asians					χ2 value, p value
	Underweight n (%)	Normal n (%)	Overweight n (%)	Pre-Obese n (%)	Obesity n (%)	
No Stress 102 (54.54%)	25 (13.36%)	31(16.58%)	15(8.02%)	29(15.51%)	02(1.07%)	χ2= 18.73,
Moderate Stress 84 (44.91%)	05 (2.67%)	33(17.65%)	15(8.02%)	23(12.30%)	08(4.28%)	
Severe Stress 01 (0.53%)	00(0%)	00(0%)	00(0%)	01(0.53%)	00(0%)	p value= 0.0164
Total (187) 100%	30 (16.04%)	64 (34.22%)	30 (16.04%)	53 (28.34%)	10 (5.35%)	

Table 3: Association of various Lifestyle Behavioral Risk factors with professional stress in study population (N=187)

DFPS score Interpretation	Variables (Lifestyle Behavioral Risk factors)							
	Dietary Habit		Any Physical Activity		Addiction (Any)		On continuous medication for chronic disease	
	Regular n (%)	Irregular n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
No Stress 102 (54.54%)	95(50.80%)	07(3.74%)	45(24.06%)	57(30.48%)	06(3.21%)	96(51.33%)	15(8.02%)	87(40.52%)
Moderate Stress 84 (44.91%)	62(33.15%)	22(11.74%)	20(10.69%)	64(34.22%)	04(2.14%)	80(42.78%)	27(14.43%)	57(30.48%)
Severe Stress 01 (0.53%)	01(0.53%)	00(0%)	01(0.53%)	00(0%)	00(0%)	01(0.53%)	00(0%)	01(0.53%)
Total (187) 100%	158(84.49%)	29(15.51%)	66(35.29%)	121(64.70%)	10(5.34%)	177(94.65%)	42(22.45%)	145(77.54%)
χ2 value, p value	χ2 value= 13.32, p value= 0.0012		χ2 value= 10.16, p value= 0.0062		χ2 value= 0.1711, p value= 0.9180		χ2 value= 8.333, p value= 0.01550	

Among them, most were in the pre-obese category (28.34%), followed by the underweight (16.04%) and overweight (16.04%) categories. The association between classification of weight of study subject according to their BMI was statistically significant (p=0.0164).

Table 3 shows association of various Behavioral Risk factors with professional stress in study population. It is seen that maximum (84.49%) of staff nurses were having intake of meals on regular time. Out of those having meals on irregular time 11.74% had moderate level stress at work. Association of

dietary habit with professional stress was statistically highly significant (p=0.0012). Out of 187 staff nurses 121(64.71%) staff nurses were not engaged in any physical activity and of them 34.22% were having moderate level stress at work.

Association of physical activity with professional stress was statistically highly significant (p=0.0062). Only 10(5.3%) staff nurses out of all had current addiction history from them 4(2.1%) was having moderate stress at work. Association of history of current addiction with professional stress was statistically not significant (p=0.9180). 42(22.45%) out of all staff nurses were on continuous medication for chronic diseases, of them 27(14.43%) were having moderate level of stress. Association of continuous medication for chronic diseases with professional stress was statistically significant (p=0.01550).One staff nurse who had meals at regular interval, engaged in physical activity, not having any kind of addiction and was not on medications for any chronic disease was having severe stress at work.

Discussion:

The present study was carried out amongst Staff nurses of a tertiary care hospital of a metropolitan city with the objective to study the relation between behavioral risk factors and category of Weight with Professional Stress among staff nurses. Maximum study subjects 81 (43.31%) belonged to 25-35 years of age-group with mean age of 40.05 years (SD =11.53). Parul Sharma et.al.[23] found in their study that 91% staff nurses were younger than 35 years (15-25 years and 25-35 years) with a mean age of 27.41 years (SD = 7.06). These observations are quite similar to present study. Ali Mohammad et.al.[26] found in their study that, the average age of staff nurses was 34 years (SD=8.31) with the youngest 21 years and oldest 65 years. These observations are quite similar to present study.

Dal Lae Chin.et.al[27] found in their study that, 31% study population were overweight and 18% were obese; 41% engaged in regular aerobic physical activity(≥150 min/week) and 57% performed regular muscle-strengthening activity (≥2 days/week). Regular aerobic physical activity was significantly associated with high job demand (OR = 1.63, 95% CI: 1.062.51). Nurses with passive jobs (low job demand combined with low job control) were significantly less likely to perform aerobic physical activity (OR = 0.49, 95% CI: 0.260.93). Regular muscle-strengthening physical activity was significantly less common among nurses working on non-day shifts (OR = 0.55, 95% CI: 0.340.89). Physical workload was not associated with obesity and physical activity. These findings are similar to present study. Lindokuhle P Phiri. et. al[28] found in their study that, Night shift nurses frequently identified weight gain and living with NCDs such as hypertension as their main health concerns.

Being overweight was perceived to have a negative impact on work performance. Nurses frequently mentioned lack of time to prepare healthy meals due to long working hours and being overtired from work. The hospital environment was perceived to have a negative influence on the nurses lifestyle behaviors, including food service that offered predominantly unhealthy foods. Present study also found that shift working nurses were either overweight or underweight with intake of meals having on irregular time. Liangzhuang Miao et al.[29] found that in the normal group of BMI, the prevalence of high emotional exhaustion, high cynicism, and low personal accomplishment among nurses was 25.1%, 37.0%, and 36.0%, respectively. In the underweight group, the prevalence of high emotional exhaustion, high cynicism, and low personal accomplishment among nurses was 29.3%, 48.6%, and 27.9%, respectively. In the overweight group, the prevalence of high emotional exhaustion, high cynicism, and low personal accomplishment among nurses was 25.4%, 35.1%, and 37.8%, respectively and in the obese group, the prevalence of high emotional exhaustion, high cynicism, and low personal accomplishment among nurses was 37.9%, 46.3%, and 32.6%, respectively. The distribution of cynicism differed

significantly between the four categories of BMI (p<0.05).These findings are similar to present study. Peplonska, et al.[30] conducted a study in which they found a Cumulative night shift work showed significant associations with BMI, with BMI increasing by 0.477 kg/m^2 per 1000 night duties and by 0.432 kg/m^2 per 10000 night shift hours. Both current and cumulative night work was associated with obesity (BMI$\geq$30kg/m^2), with OR=3.9 (95%CI:1.5-9.9), in women reporting eight or more night shifts per month. These findings are similar to present study.

Conclusion:

It is concluded from the present study that behavioral risk factors like abnormal Body Mass Index, irregular intake of meals, lack of physical activity have impact on professional stress of staff nurses. Nutritional status like under nutrition, over nutrition and obesity induces stress at work. All behavioral risk factors like physical activity, diet, addiction and regular medications are correlated with increased stress at work. There is a need for Hospital management to develop appropriate intervention programs to reduce workload, make regular shift schedules, and provide positive reinforcements at workplace.

Recommendations:

1. Duty shifts time table should be made in such a way that after 5 working days, staff nurses should get compulsory 1 day holiday.

2. Hospitals should have a separate canteen for all health professionals who can serve nutritious food for all meals in low price.

3. Compulsory Yoga sessions for 45 minutes thrice a week should kept for staff nurses and other health professionals.

4. Regular monitoring of lifestyle parameters like weight, BMI, Waist to Hip ratio, screening for Non communicable diseases at every 3 months interval will keep staff nurses in tract of their health status.

Declaration:

References:

1. Burton J. World Health Organization: WHO Healthy workplace framework and model: Background and supporting literature and practices. 2010:2-123.

2. Quintiliani L, Sattelmair J, Sorensen G. The Workplace As A Setting For Interventions To Improve Diet And Promote Physical Activity. 2007.

3. Batt ME. Physical activity interventions in the workplace: the rationale and future direction for workplace wellness. Br J Sports Med. 2009;43:4748. doi: 10.1136/bjsm.2008.053488.

4. Skaal L, Pengpid S. Obesity and health problems among South African healthcare workers: do healthcare workers take care of themselves? S Afr Fam Pract. 2011;53:563567. doi: 10.1080/20786204.2011.10874153.

5. World Health Organization. Global status report on noncommunicable diseases 2010. Available from: http://www.who.int/nmh/publications/ncd_report2010/en/.

6. Brown PWJ. Development of Evidence-based Physical Activity Recommendations for Adults (18-64 years). 2010:170.

7. Tsismenakis AJ, Christophi CA, Burress JW, Kinney AM, Kim M, Kales SN. The obesity epidemic and future emergency responders. Obesity (Silver Spring). 2009 Aug;17(8):164850.

8. Pietroiusti A, Neri A, Somma G, Coppeta L, Iavicoli I, Bergamaschi A, et al. Incidence of metabolic syndrome among night-shift healthcare workers. Occup Environ Med. 2010 Jan;67(1):547.

9. Daraiseh NM, Cronin SN, Davis LS, Shell RL, Karwowski W. Low back symptoms among hospital nurses, associations to individual factors and pain in multiple body regions. Int JIndErgonom. 2010;40(1):1924.

10. Nursing Times. How happy and healthy are nurses? Nursing Times.net. 2008. Available from: http://www.nursing times.net/nursingpractice/specialisms/occupational-health/how-happy-and-healthy-are-nurses/1902473.article (Accessed 10 August, 2015).

11. Blaber AY. Exercise, who needs it? Br J Nurs. 2005;14(18): 973-5.

12. Chang E, Hancock KM, Johnson A, Daly J, Jackson D. Role stress in nurses: review of related factors and strategies for moving forward. Nurs Health Sci. 2005;7(1):57-65.

13. Simoes EJ, Byers T, Coates RJ, et al. The association between leisure-time physical activity and dietary fat in American adults. Am J Publ Health. 1995;85:240-4.

14. Stephens SK, Cobiac LJ, Veerman JL. Improving diet and physical activity to reduce population prevalence of overweight and obesity: an overview of current evidence. Prev Med. 2014;62:167-178.

15. Miller SK, Alpert PT, Cross CL. Overweight and obesity in nurses, advanced practice nurses, and nurse educators. J Am Acad Nurse Pract. 2008;20(5):259-265.

16. Zitkus BS. The relationship among registered nurses weight status, weight loss regimens, and successful or unsuccessful weight loss. J Am Acad Nurse Pract. 2011;23(2):110-116.

17. Bogossian FE, Hepworth J, Leong GM, Flaws DF, Gibbons KS, Benefer CA, Turner CT. A cross-sectional analysis of patterns of obesity in a cohort of working nurses and midwives in Australia, New Zealand, and the United Kingdom. Int J Nurs Stud. 2012;49(6):727-738.

18. Goon DT, Maputle MS, Olukoga A, Lebese R, Khoza LB, Ayanwu FC. Overweight, obesity and underweight in nurses in Vhembe and Capricorn districts Limpopo. S Afr J ClinNutr. 2013;26(3):147-149.

19. Amani R, Gill T. Shift working, nutrition and obesity: implications for workforce health-a systematic review. Asia Pac J ClinNutr. 2013;22(4):698.

20. Zapka JM, Lemon ST, Magner RP, Hale J. Lifestyle behaviours and weight among hospital-based nurses. J Nurs Manag. 2009 Nov;17(7):853-60.

21. Cheung ST. The effects of chocolates given by patients on the well-being of nurses and their support staff. Nutr Health. 2003;17(1):65-9.

22. Wong H, Wong MC, Wong SY, Lee A. The association between shift duty and abnormal eating behaviour among nurses working in a major hospital: a cross-sectional study. Int J Nurs Stud. 2010;47(8):1021-7.

23. Sharma P, Davey A, Davey S, Shukla A, Shrivastava K, Bansal R. Occupational stress among staff nurses: Controlling the risk to health. Indian J Occup Environ Med. 2014 May;18(2):52.

24. Professional life stress scale. Available from: https://www.qatarliving.com/filipino-expatriates-qatar/posts/professional-life-stress-scale

25. Indian BMI chart for men and women. Available from: https://possible.in/indian-bmi-chart-men-women.html

26. Mosadeghrad AM. Occupational stress and turnover intention: Implications for nursing management. Int J Health Policy Manag. 2013;1(2):16976.

27. Dal Lae Chin. Occupational factors associated with obesity and leisure-time physical activity among nurses: A cross-sectional study. Int J Nurs Stud. 2016 May;57:60-69.

28. Phiri LP, Draper CE, Lambert EV, Kolbe-Alexander TL. Nurses lifestyle behaviours, health priorities and barriers to living a healthy lifestyle: a qualitative descriptive study. BMC Nurs. 2014;13:38. doi: 10.1186/s12912-014-0038-6.

29. Miao L, Niu X, Huang M, Cao G, Fu C. Association between body mass index and burnout among nurses in China: a cross-sectional study. BMJ Open. 2024;14(3). doi: 10.1136/bmjopen-2023-081203.

30. Peplonska B, Bukowska A, Sobala W. Association of Rotating Night Shift Work with BMI and Abdominal Obesity among Nurses and Midwives. PLoS One. 2015;10(7) . doi: 10.1371 journal.pone.0133761.