

Stress among Indian Doctors: A Gender Variation

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ABSTRACT

Objective: Variations in work related stress and physical activity levels have been seen with an emphasis on sex difference. This cross-sectional study was designed to report the gender difference in stress dynamics and physical activity, and propose a framework for finding out the source causing these differences and associated lifestyle risk factors for cardio-metabolic disorders. **Design:** A cross-sectional study was designed which analysed 113 doctors (58 females and 55 males) for perceived and measured stress using validated questionnaires and methods. Long term time domain index of Heart Rate Variability was used to measure stress. Physical activity levels were also measured along with history questionnaire focusing on risk factors of lifestyle disorders. **Results:** The perceived stress measured by PSS-14, MSP-9 and VAS(stress) showed higher recorded values in female doctors (45.50±4.08, 36.21±7.52, 6.07±2.26) as compared to male doctors (44.00±5.58, 34.40±6.81, 5.47±2.25), respectively. The measured stress showed a significant comparison between both the genders putting males (44.79±10.69) under more stress than females (50.76±11.69) ($p<0.05$). The energy expenditure was higher in female doctors (2171.09±1703.66) than male doctors (1981.21±1440.17). **Conclusion:** Female doctors had high perceived stress levels with high levels of physical activity whereas male counterparts had high measured stress with low measured physical activity levels.

Keywords: Doctors, Perceived Stress, Measured Stress, Physical Activity, Gender Variation.

The doctors' compassion towards their work can be compromised by the doctors' distress (Sehlen, et al., 2009) (Bellini, Baime, & Shea, 2002) (Firth-Cozens & Greenhalgh, 1997). An increased convergence has been suggested in domestic and occupational roles of female and male doctors, hence showing a relation between stress and increased role complexity. Characterising the medical fraternity to be vulnerable to stress between home and work (Swanson, Power, & Simpson, 1998).

The individual difference plays an important moderating function on the impact of stress (Caplan, Cobb, French, Harrison, & Pinneau, 1975). The magnitude of experienced stress has

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been examined using individual variations in values, abilities, personality characteristic and occupational level (Caplan, Cobb, French, Harrison, & Pinneau, 1975).

In past decades, special attention has been paid in understanding work related stress with an emphasis on sex difference (Jick & Mitz, 1985). The risk factor for developing cardiac arrhythmias, hypertension, coronary heart disease, diabetes mellitus, and variations in lipid profile has been associated with psychological stress (Zipes, Libby, Bonow, & Braunwald, 2005)(8). This cross-sectional study was designed to report the sex difference in stress dynamics and propose a framework for finding out the source causing these differences and associated lifestyle risk factors for cardio-metabolic disorders.

METHODOLOGY

The doctors working in various departments in Government Medical College, Amritsar, Punjab, India, were recruited for an analytical cross-sectional study design. A total of 113 participants who volunteered were from various departments under surgical, medical and para-clinical and pre-clinical specializations. The categorisation was made according to gender which included 58 female and 55 male doctors. Those who had incomplete participation in the study and those who underwent recent cardiovascular surgery were excluded from the study. Those with any metabolic disorders or cardiovascular disorders were included in the study.

The study protocol was approved by Departmental Ethics Committee, Department of Sports Medicine and Physiotherapy, Guru Nanak Dev University, Amritsar. The participants were briefed about the protocol and signed the written informed consent before the data collection.

Data Collection

The doctors were assessed for various parameters for stress and physical activity along with the history associated with the risk factors for cardio-metabolic disorders. The data collection started when the doctors arrived in their respective departments. All the doctors in a particular department were assessed at a time. Prior to the filling of questionnaires doctors were assessed for anthropometric measurements (height (cm), weight (kg), hip circumference (cm), and waist circumference (cm), waist to hip ratio (WHpR) and Body Mass Index (BMI). Later they were asked to fill up the questionnaires, including history, Perceived Stress Scale 14 Questionnaire (PSS 14), short 9-item Psychological Stress Measurement (MSP-9) questionnaire, and International Physical Activity Questionnaire (IPAQ) short form questionnaire. Following which they were assessed for physiological parameter like Heart Rate Variability (HRV) using accelerometers (Zephyr BioHarness 3.0 (BioHarness, Zephyr Technology, Auckland, New Zealand)) which were worn around the chest. The HRV was recorded for 3 consecutive working days (Martinez De Tejada, et al., 2013) (Nang, et al., 2011). These accelerometers are wireless ambulatory physiological monitoring system which records raw one lead electrocardiography (ECG). The data was analyzed using HRV 2.1 software (Kubios1, Kuopio, Finland) and a note was made for the long term time domain index of HRV, i.e. standard deviation of the heart beat intervals in ms (SDNN). At the end of the working day the accelerometer belts were returned and

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doctors were asked to fill the Visual Analogue Scale for daily perceived stress and physical activity.

Statistical analysis

The data was assessed gender-wise using IBM SPSS Statistics (Version 20) software. The frequency distribution and Mean (Mean \pm SD) for variables were compared using One way analysis of variance (ANOVA) and Mann-Whitney U test. The sample size calculated was 109.98, with 95% confidence interval, expected population size of (p) 0.35 and precision of 0.05.

RESULTS

The study included 58 female doctors and 55 male doctors with an average age of 33.03 \pm 10.24 and 36.51 \pm 11.48, respectively. The measured stress, SDNN, showed a significant comparison between both the genders putting males (44.79 \pm 10.69) under more stress than females (50.76 \pm 11.69) ($p < 0.05$). The perceived stress measured by PSS-14, MSP-9 and VAS(stress) showed higher recorded values in female doctors (45.50 \pm 4.08, 36.21 \pm 7.52, 6.07 \pm 2.26) as compared to male doctors (44.00 \pm 5.58, 34.40 \pm 6.81, 5.47 \pm 2.25), respectively (Table 1). 37.93% females were categorised under very high stress (≥ 41) on MSP-9 scale (Table 2).

Measured physical activity levels by accelerometers did not show any difference while the perceived daily physical activity on VAS scale showed females to have more physically active day. The energy expenditure was higher in females (2171.09 \pm 1703.66) than males (1981.21 \pm 1440.17) (Table 1), where 15.52% females indulging in high grade physical activity (>3000 METs-minutes/week) as compared to 10.91 % males (Table 2).

None of the female doctors in this population reported intake of alcohol while 83.64% male doctors consumed alcohol varying from an average of 1 drink per day to more than 3 drinks per day, showing a significant comparison ($p < 0.05$). The consumption of coffee and tea also showed significant comparison between both the sex ($p < 0.05$). 36.36% male doctors consumed an average of more than 3 cups of tea per day. Higher number of females than males did not indulge in sporting activity (82.76%) but 43.10% did meditation or yoga. Male doctors had shown high values on anthropometrical scales, where 81.82% were obese (BMI ≥ 25) and 83.64% were centrally obese (WHpR $\text{♂} \geq 0.88$; $\text{♀} \geq 0.81$). (Table 2)

DISCUSSION

It is been postulated by sociologists that according to differential vulnerability hypothesis, the employed females are under more stress than employed men under the same social environmental cues (Roxburgh, 1996), explaining high perceived stress among female doctors working in this setup of public teaching hospital. The measured stress was high among male doctors. We can cite that an additional domestic workload to the routine occupational work could lead to the high perceived stress in females. A meta-analysis by Jick, et al. has stated that psychological distress is higher among women which make them more prone for severe physical illness (Jick & Mitz, 1985).

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The female doctors were found out to be more physically active by indulgence in high grade physical activities than male doctors, reflected by increased values of time domain indices of HRV (SDNN) in this study. The physical activity causes enhanced vagal tone which is reflected by higher values of HRV (Aubert, Seps, & Beckers, 2003) (Luque-Casado, Zabala, Morales, Mateo-March, & Sanabria, 2013) (Hautala, et al., 2010). The high indulgence in physical activity can be cited as a mode of coping strategy adopted by female doctors to overcome the perceived stress. The participation of female doctors have been more in para-clinical and pre-clinical fields with predominance of laboratory, research and teaching work, apart from the more frantic and stressful specialities of internal medicine, and obstetrics and gynaecology. The work in para-clinical and pre-clinical fields can be considered to cause less burnout without hampering their domestic life. Acceptance and learning of coping strategies and less work related physical strain may be cited as the reason for better care, greater empathy and practice of evidence-based guidelines in medicine (Wen, December).

On the contrary, it was found that the male counterparts had lower values for recorded SDNN. This decreased HRV among male doctors reflected high measured stress and poor cardiovascular response to physical activity leading to genesis of lifestyle disorders. High alcohol and tea consumption among male doctors along with association of central obesity makes them more prone for health problems. The consumption of coffee and tea has shown its association with cardiovascular diseases (Yano, Rhoads, & Kagan, 1977) (Peters, Poole, & Arab, 2001). The consumption of alcohol and tobacco was recorded negligible among females which can be reasoned to the social taboo in this part of the country. Anthropometrical variables have also shown an association with dyslipidaemia and hypertension (Bertsias, Mammias, Linardakis, & Kafatos, 2003) and can be cited as a reason for higher future incidence of cardio-metabolic disorders among doctors.

It is been required to identify work related stressors and those who are suffering from this stress, so that adequate coping strategies and health promotion programs can be developed and implemented among the medical fraternity. The programs must be gender specific, must consider doctors working on various designations in medical specialities and include the promotion of various ways of living healthy lifestyle by including physical activity and healthy eating habits. A special emphasis should be given to doctors under training, irrespective of the gender, by inclusion of counselling and learning of coping strategies in their training curriculum. This might help to lead a healthier and less stressful life among doctors themselves without hampering their efficacy at work.

To the best of our knowledge the literature have lacunae for the gender differentiation of psychological stress among Indian doctors. This study being one of its kinds to fills in the void by inclusion of validated questionnaires and modalities for assessment of psychological stress and physical activity levels among male and female doctors in a public teaching hospital.

LIMITATIONS

The doctors working on various designations among different medical specialities ranging from the residents to the senior most specialists would give a gender specific stress level, thus helping in formulating health promotion programs which are gender and designation specific. The financial constraints prevented us to use the biochemical analysis, including cortisol and catecholamine's, for the quantification of stress which would have given us a specific stress levels among individuals. An additional use of biochemical parameters for assessment of cardio-metabolic risk factors would have given us an additional insight on the health effects of stress.

REFERENCE

- Aubert, A. E., Seps, B., & Beckers, F. (2003). Heart rate variability in athletes. *Sports Medicine*, 33(12), 889-919.
- BelliniX, L., Baime, M., & Shea, J. (2002). Variation of mood and empathy during internship. *JAMA*, 287(23), 3143-3146.
- Bergovec, M., & Orlic, D. (2008). Orthopaedic surgeons' cardiovascular response during total hip arthroplasty. *Clinical Orthopaedics and Related Research*, 466, 411-416.
- Bertsias, G., Mammas, I., Linardakis, M., & Kafatos, A. (2003). Overweight and obesity in relation to cardiovascular disease risk factors among medical students in Crete, Greece. *BMC Public Health*, 3(1), 3.
- Caplan, R., Cobb, S., French, J., Harrison, V., & Pinneau, S. R. (1975). Job demands and worker health. *Ann Arbor, Mich.: Institute for Social Research*.
- Firth-Cozens, J., & Greenhalgh, J. (1997). Doctors' perceptions of the link between stress and lowered clinical care. *Soc Sci Med*, 44, 1017-1022.
- Hautala, A. J., Karjalainen, J., Kiviniemi, A. M., Kinnunen, H., Mäkikallio, T. H., Huikuri, H. V., & Tulppo, M. P. (2010). Physical activity and heart rate variability measured simultaneously during waking hours. *American journal of physiology. Heart and circulatory physiology*, 298, H874-H880.
- Jick, T. D., & Mitz, L. F. (1985). Sex Differences in Work Stress. *The Academy of Management Review*, 10(3), 408-420.
- Luque-Casado, A., Zabala, M., Morales, E., Mateo-March, M., & Sanabria, D. (2013). Cognitive Performance and Heart Rate Variability: The influence of fitness level. *PLoS ONE*, 8(2), e56935. doi:10.1371/journal.pone.0056935
- Martinez De Tejada, B., Jastrow, N., Poncet, A., Le Scouezec, I., Irion, O., & Kayser, B. (2013). Perceived and measured physical activity and mental stress levels in obstetricians. *European Journal of Obstetrics Gynecology and Reproductive Biology*, 171, 44-48.

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- Nang, E. E., Ngunjiri, S. A., Wu, Y., Salim, A., Tai, E. S., Lee, J., & Van Dam, R. M. (2011). Validity of the international physical activity questionnaire and the Singapore prospective study program physical activity questionnaire in a multiethnic urban Asian population. *BMC Medical Research Methodology*, *11*, 141. Retrieved from <http://www.biomedcentral.com/1471-2288/11/141>
- Peters, U., Poole, C., & Arab, L. (2001). Does tea affect cardiovascular disease? A meta-analysis. *American Journal of Epidemiology*, *154*(6), 495-503.
- Roxburgh, S. (1996). Gender difference in Work and Well-Being: Effects of Exposure and Vulnerability. *Journal of Health and Social Behaviour*, *37*, 265-277.
- Sehlen, S., Vordermark, D., Schäfer, C., Herschbach, P., Bayerl, A., Pigorsch, S., . . . Geinitz, H. (2009, Feb 6). Job stress and job satisfaction of physicians, radiographers, nurses and physicists working in radiotherapy: a multicenter analysis by the DEGRO Quality of Life Work Group. *Radiation oncology (London, England)*, *4*(6). doi:10.1186/1748-717X-4-6
- Swanson, V., Power, K. G., & Simpson, R. J. (1998). Occupational stress and family life: A comparison of male and female doctors. *Journal of Occupational and Organizational Psychology*, *71*(3), 237-260.
- Wen, L. (December, 2013 13). *Women's Health*. Retrieved from [womenshealthmag: http://www.womenshealthmag.com/health/female-physicians](http://www.womenshealthmag.com/health/female-physicians)
- Yano, K., Rhoads, G. G., & Kagan, A. (1977). Coffee, Alcohol and Risk of Coronary Heart Disease among Japanese Men Living in Hawaii. *N Engl J Med*, *297*, 405-405. doi:DOI: 10.1056/NEJM197708252970801
- Zipes, D., Libby, P., Bonow, R., & Braunwald, E. (2005). *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine* (7th ed.). Philadelphia: PA: Elsevier Saunders.

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Table 1. The gender-wise values (Mean±SD) for anthropometric variables, scores of perceived stress and physical activity questionnaires and measured physiological parameters for doctors.

		Department		F	p value
		Females	Males		
		(n=58)	(n=55)		
		Mean±SD	Mean±SD		
Age (years)		33.03±10.24	36.51±11.48	2.117	0.092
Anthropometrical Values	BMI	23.71±4.29	27.71±3.20	4.186	0.000*
	Waist Circumference (WC) (cm)	79.38±9.66	87.51±7.65	3.294	0.000*
	Waist: Hip Ratio (WHpR)	0.86±0.07	0.91±0.05	4.862	0.000*
Perceived Stress Scores	PSS-14 Score	45.50±4.08	44.00±5.58	0.606	0.130
	MSP-9 Score	36.21±7.52	34.40±6.81	1.661	0.184
	VAS (Stress)	6.07±2.26	5.47±2.25	0.345	0.162
Physical Activity Scores	IPAQ Short form Score (METs-min/week)	2171.09±1703.66	1981.21±1440.17	0.864	0.525
	VAS (Physical Activity)	5.10±2.27	4.95±2.38	0.005	0.718
	Activity	0.06±0.02	0.06±0.02	0.884	0.289
Physiological parameter	HRV (SDNN, ms)	50.76±11.69	44.79±10.69	0.844	0.006*

* $p \leq 0.05$ is significant.

BMI: Body Mass Index; PSS: Perceived Stress Scale; IPAQ: International Physical Activity Questionnaire; MSP: Psychological Measured Stress; VAS: Visual Analogue Score; HRV: Heart Rate Variability; SDNN: Standard Deviation of R-R interval.

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Table 2. The gender-wise frequency distribution of the doctors, based on classifications of anthropometric variables, history questionnaire, and scores of perceived stress and physical activity questionnaires.

Variable			Department		Mann-Whitney U	Asymp. Sig. (2-tailed)
			Females	Males		
			(n = 58)	(n = 55)		
			n %	n %		
Anthropometric data	BMI	Normal (≤ 23)	56.90	7.27	674.50	0.000*
		Overweight (23.1-24.9)	13.79	10.91		
		Obesity (≥ 25)	29.31	81.82		
	Waist Circumference (WC)	Normal ($\text{♂} < 85\text{cm}$, $\text{♀} < 80\text{cm}$)	50	40	1435.50	0.288
		Risk/Abnormal ($\text{♂} \geq 85\text{cm}$, $\text{♀} \geq 80\text{cm}$)	50	60		
	Waist:Hip (WHpR)	Normal ($\text{♂} < 0.88$, $\text{♀} < 0.81$)	24.14	16.36	1.47	0.307
Risk for upper body obesity ($\text{♂} \geq 0.88$, $\text{♀} \geq 0.81$)		75.86	83.64			
History Questionnaire	Alcohol	0 drinks daily	100	16.36	261.00	0.000*
		Average 1 drink daily or 7 units per week	0	70.91		
		Average 2 drinks daily or 14 units per week	0	7.27		
		Average 3 or more drinks daily or 21 or more units per week	0	1.82		
		Do you consume (in one sitting on a fortnightly or more frequent basis)	0	3.64		
	Tea (No. of cups)	No	48.28	18.18	905.00	0.000*
		Upto 3 Cups	44.83	45.45		
		More than 3 Cups	6.90	36.36		
	Coffee (No. of Cups)	No	70.69	89.09	1.298	0.015*
		Upto 3 Cups	27.59	10.91		
		More than 3 Cups	1.72	0		
	Meditation/ Yoga	No	56.90	76.36	1284.500	0.029*
		Yes	43.10	23.64		
	Sporting activity	No	82.76	80	1551.00	0.708
		Yes	17.24	20		
	DM	No	94.83	98.18	1.542	0.337
		Yes	5.17	1.82		
	CVD	No	94.83	98.18	1.542	0.337
		Yes	5.17	1.82		
	Sleep	0-4 (Hrs/day)	5.17	5.45	1.574	0.894
5-6 (Hrs/day)		50	45.45			
7-8 (Hrs/day)		37.93	47.27			
More than 8 hours		6.89	1.82			
a c	IPAQ	Low Grade (<600 METs-	18.97	20	1.522	0.610

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	Short form	minutes/week)				
		Moderate Grade (600-3000 METs-minutes/week)	65.52	69.09		
		High Grade (>3000 METs-minutes/week)	15.52	10.91		
	MSP Questionnaire	Low Stress (<31)	24.14	25.45	1.365	0.155
		High Stress (≥31 and <41)	37.93	54.54		
		Very High Stress (≥41)	37.93	20		

* $p \leq 0.05$ is significant.

BMI: Body Mass Index; PSS: Perceived Stress Scale; DM: Diabetes Mellitus; CVD: Cardio-Vascular Disease; IPAQ: International Physical Activity Questionnaire; MSP: Psychological Measured Stress.