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Research article

Association of Work-related posture and stress with Scapular dyskinesis among Computer professionals

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ABSTRACT

Abnormal stress due to poor posture and work environment are contributing factors in musculoskeletal adaptations resulting in problems like neck pain, back pain, shoulder pain, etc. The scapula plays several roles in facilitating optimal shoulder function and it is very important for the function of the upper extremity. Thereby impact of work-related posture & stress on computer professionals with scapular dyskinesis should be established. 350 male computer professionals (Mean Age = 34.89±8.51 years) following written informed consent were recruited from IT companies and volunteered for this study. Computer professionals involved in fieldwork, with BMI $\geq$ 25 Kg/m^2, having congenital postural deformities, undergone neck/shoulder surgeries were excluded from the study. Each professional was examined for scapular dyskinesis using Kibler's rating system (Yes/No method). Professionals were then examined for Work related posture using - Rapid Office Strain Assessment (ROSA) & Rapid Upper Limb Assessment (RULA) and perception of stress during work [Perceived stress scale (PSS)]. Results were analyzed using descriptive statistics and the association was analyzed using chi-square and bivariate logistic regression. (Level of significance $p<0.05$). In the present study, 78% (n = 273) of computer professionals were found to have scapular dyskinesis. Assessment using ROSA indicated 56.3% (n= 197, χ^2 (1, $n=350$) =11.0, $p=0.004$) [(OR = 0.54; $p=0.01$)] computer professionals have moderate risk, 15.1% (n=53) have mild and 6.6% (n=23) have a moderate risk of developing musculoskeletal disorders. Similarly, the RULA scale assessment highlighted 66% [(n=231, χ^2 (1, $n=350$) =11.3, $p=0.045$] [OR =0.87; $p=0.28$)] computer professionals having poor posture, 7.2% (n=25) with worst posture and only 4.8% (n=17) having mild deviation. Perception of stress during work was low in 4.3% (n=15), moderate in 67.1% [(n=235, χ^2 (1, $n=350$) =2.5, $p=0.27$][(Exp(B)=0.95; $p=0.04$)]) and high in 23% (n=23) computer professionals. The present study concluded that computer professionals with scapular dyskinesis represent poor posture and have a moderate risk of developing musculoskeletal disorders along with moderate stress while working on computers.

INTRODUCTION

Office work represents a complex physical work environment, with interactions among the various dimensions of the workstation and equipment, speed of data entry, position and lighting of visual targets (screen and documents), and job content. This type of work has been related to some Work-Related Musculoskeletal Disorders (WRMDs) due to risk factors like awkward, or critical, postures, prolonged static sitting, sustained non-neutral postures of the upper limbs, static low load or repetitive work, increased muscular activity in the upper back and shoulders, duration of the work and time pressure [1,2].

Most of these risk factors are related to the interaction of the office workers with components of the workstation such as the desk, chair, monitor, mouse, keyboard, and telephone. The main

musculoskeletal disorders associated with computer work affect the upper extremities, neck, head, and spine. This increase in the use of computers at work results in compromised employee well-being [3]. Postural malalignment is generally the cause of work-related musculoskeletal disorders among office workers. Scapula plays several roles in facilitating optimal shoulder function and it is very important for the function of the upper extremity. Alterations in the normal position of the scapula and the patterns of scapular motion during scapulohumeral movements are defined as scapular dyskinesis. Work-related pain can impact the ability to perform normal daily activities and the resultant treatment costs and work loss contribute to a substantial economic burden for both the individual and society.

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It is also necessary to consider the relationship between working posture and workers' mental health. Workers' mental health is an essential issue in the workplace. Depression and anxiety are associated with a significant economic impact as well as workers' quality of life. Environmental factors, such as noise and temperature, are also associated with psychological stress. Furthermore, working environments, including setup and personal protective equipment availability, were associated with anxiety levels in healthcare workers. The physical working environment, including all the material objects and stimuli that workers are exposed to in the workplace, is known to be associated with mental health.[6].

Among these various risk factors, work-related psychosocial factors appear to play a major role. Work-related psychosocial variables may include aspects of the work content, organization, interpersonal relationships at work, finances, and economics. Individual factors are considered confounding factors that influence the relationship between psychosocial demands and the occurrence of neck pain. Furthermore, psychosocial demands may be highly correlated with physical demands, which also indicates a confounding effect of physical factors on the relationship between work-related psychosocial variables and the occurrence of WRMDs-related pain. The Perceived Stress Scale (PSS) is a classic stress assessment through a scoring system [7].

MATERIALS AND METHODS

Three hundred fifty (350) male computer professionals, of Mean Age - 34.89±8.51 years & BMI - 22.69 ± 2.05 kg/m², following written informed consent were recruited from IT companies and volunteered for this study. Computer professionals involved in fieldwork, with BMI ≥ 25 Kg/m², having congenital postural deformities, undergone neck/shoulder surgeries were excluded from the study. Each professional was examined for scapular dyskinesis using the observational method (Yes/No). Professionals who have alteration in the scapular kinematics (inferior border prominence, medial border prominence, or superior border prominence according to the classification of scapular dyskinesis by Kibler) having scapular dyskinesis (Yes) and those who did not show any scapular deviation were considered normal or not having scapular dyskinesis (No)[14] Professionals were then examined for office ergonomics [Rapid office strain assessment (ROSA), Rapid upper limb assessment (RULA)] and perceived stress during work [Perceived stress scale (PSS)] [16;17].

RESULT AND DISCUSSION

The data were analyzed using the statistical package for the social sciences software (SPSS 20, Chicago, USA).

Categorical data were analyzed by Pearson chi-square test and bivariate Logistic regression to determine the association between scapular dyskinesis and office ergonomics [Rapid office strain assessment (ROSA), Rapid upper limb assessment (RULA)] and perceived stress during work [Perceived stress scale (PSS)]. A 'p-value of less than 0.05 was considered the level of significance for all statistical tests.

Table 1.1 illustrated the frequency of scapular dyskinesis (Y/N) in computer professionals. In the present study, it was observed that out of 350 computer professionals, 273(78%) professionals were found to have scapular dyskinesis (Y) and 77(22%) were found No (N) scapular dyskinesis.

Table 1.1: Scapular dyskinesis(Y/N) distribution in the study population

n = 350		
Scapular Dyskinesis	N	%
Yes	273	78
No	77	22

Table 1.2 illustrated a statistical analysis of Rapid Upper Limb Assessment (RULA). Pearson chi-square test of independence was performed to examine the relationship between independent variables amongst scapular dyskinesis (Y) and (N). The chi-square test of independence showed that there was a significant association between the RULA score[(n=231;66%), χ^2 (1, $n=350$) =11.3, p=0.045]

Table 1.2: Association of Scapular dyskinesis (SD) with Rapid upper limb assessment (RULA)

VARIABLES	YES(n=273)		NO(n=77)		χ^2
Rapid Upper Limb Assessment (RULA)	n	%	n	%	
3-4 (Mild deviation)	17	4.8	6	1.7	
5-6 (Poor Posture)	231	66	57	16.3	11.3
7-8 (Worst Posture)	25	7.2	14	4	

Table 1.3 illustrate a statistical analysis of rapid office strain assessment (ROSA). The chi-square test of independence showed that there was a significant association between the ROSA score [(n=197;56.3%), χ^2 (1, $n=350$) =11.0, p=0.004] in scapular dyskinesis(Y).

Table 1.3: Association of Scapular dyskinesis (SD) with Rapid Office Strain Assessment (ROSA)

VARIABLES	YES(n=273)		NO (n=77)		χ^2	p-value
	n	%	N	%		
Rapid Office Strain Assessment (ROSA)						
4 (Mild Risk)	53	15.1	12	3.4		
5(Moderate Risk)	197	56.3	48	13.7		
6 (High Risk)	23	6.6	17	4.9	11.0	0.004 (S)

Table 1.4 illustrate a statistical analysis of the Perceived stress scale (PSS). The chi-square test of independence showed that there was an insignificant association between the PSS score [(n=237;67.1%), χ^2 (1, $n=350$) =2.5, p=0.27] in scapular dysk

Similarly, Bivariate Logistic regression was used to determine the association between SD and various office ergonomic factors i.e., RULA, ROSA, and PSS. Each one-unit increase in ROSA scores increases the odds of having scapular dyskinesis by a factor of

0.53. inesis(Y).

Table 1.4: Association of Scapular dyskinesis (SD) with Perceived stress scale (PSS)

VARIABLES	YES(n=273)		NO (n=77)		χ²	p-value
	n	%	n	%		
Perceived Stress Scale (PSS)						
0-13 (Low Stress)	15	4.3	5	1.4	2.5	0.27 (NS)
14-26(Moderate stress)	235	67.1	61	17.4		
27-40(High stress)	23	6.6	11	3.1		

Computer professionals with moderate risk (score = 5 in ROSA score are 0.53 times as likely to have scapular dyskinesis as computer

professionals falling in the mild risk (score = 4) category. Likewise, computer professionals who have moderate stress (score = 14-26) are 0.95 times as likely to have scapular dyskinesis as computer professionals who have low stress (score = 0-13). Results indicated the association between work-related posture (ROSA) and stress (PSS) with scapular dyskinesis among computer professionals was particularly high. The Scapula plays an important role in causing scapular symptoms in the upper extremity. This position has been shown to change the normal plane orientation of the scapula. In the present study, 78% incidence of scapular dyskinesis was found in computer professionals.

Table 1.5: Determining association of Office ergonomics {Rapid upper limb assessment (RULA), Rapid office strain (ROSA) & Perceived stress scale (PSS)} with Scapular dyskinesis.

Work-related posture & Stress						95%C.I. for EXP(B)	
	B	S.E.	Wald	Df	Sig.	Exp(B) Lower	Upper
RULA SCORE	-0.13	0.12	1.13	1	0.28	0.87 (NS) 0.67	1.12
ROSA SCORE	-0.60	0.24	6.10	1	0.01	0.54 (S) 0.33	0.88
PERCEIVED STRESS SCALE (PSS)	-0.04	0.02	3.95	1	0.04	0.95 (S) 0.919	0.99

After the evaluation of computer professionals with RULA, it was found that almost 66% [(n=231), χ^2 (1, *n=350)* =11.3, *p*=0.045] [(Exp(B)=0.87; *p*=0.28)] of computer professionals were found to be working in poor posture; with ROSA, 56.3% [(n=197), χ^2 (1, *n=350)* =11.0, *p*=0.004] [(Exp(B)=0.54; *p*=0.01)] of computer professionals were at moderate risk of developing musculoskeletal disorders and with PSS, 67.1% [(n=237), χ^2 (1, *n=350)* =2.5, *p*=0.27][(Exp(B)=0.95; *p*=0.04)] of professionals were experiencing moderate stress during working on computers and establish relationships with work posture (rotation of the head and neck, asymmetric body), poor work habits (sitting in one position for a long time, repetitive movements, or working with lifted shoulders), and psychological stress in computer professionals. Evidence suggests that neck/shoulder and upper extremity region complaints were significantly more among office workers and they associated these complaints with poor head/body posture and work demands. Also, it was found that musculoskeletal disorders increase as the duration of daily computer usage increases and showed statistically significant relationships between musculoskeletal system disorders and computer usage of more than four hours/per day [8][19] Also, individuals having breaks while working at computers were experiencing less pain, while the individuals not having breaks were experiencing more work-related discomfort.

Awkward and static work posture leads to changes in the musculoskeletal system of office workers. Scapular dyskinesis was especially observed in individuals who had problems in the activity and function of the upper extremities. Better work conditions and posture alignment should be ensured in office workers so that may be protected from scapular dyskinesis and work-related pain in computer professionals [4].

CONCLUSION

Evaluation of computer professionals during office work is an important aspect to understand work-related posture and psychological stress during working on computers. The present study concluded that computer professionals with scapular dyskinesis represent poor posture and have a moderate risk of developing musculoskeletal disorders along with moderate stress while working on computers.

REFERENCES

1. Michael Sonne, Dino L Villalta, David M Andrews, et al, 2012. Development and evaluation of an office ergonomic risk checklist: ROSA – Rapid office strain assessment, 43(1), 98–108. DOI: 10.1016/j.apergo.2011.03.008

2. Matos M Arezes, Pedro M, 2015. Ergonomic Evaluation of Office Workplaces with Rapid Office Strain Assessment (ROSA). Procedia Manufacturing, 3(), 4689–4694. DOI: 10.1016/j.promfg.2015.07.562

3. Gholami T, Maleki Z, Ramezani M, Khazraee T, et al, 2018. Application of ergonomic approach in assessing musculoskeletal disorders risk factors among administrative employees of medical university. International Journal of Musculoskeletal Pain Prevention, 3(2), pp.63-67

4. Depreli O, Ender Angın E, Yatar IG, Kirmizigil B, Malkoc M, et al, 2016. Scapular dyskinesis and work-related pain in office workers-a pilot study. Int J Phys Ther Rehab, 2(117), p.2. DOI: 10.15344/2455-7498/2016/117

5. Cools A M J, Struyf F, De Mey K, Maenhout A, Castelein B, Cagnie B, et al, 2014. Rehabilitation of scapular dyskinesis: from the office worker to the elite overhead athlete. British Journal of Sports Medicine, 48(8), 692–697. DOI: 10.1136/bjsports-2013-092148

6. Kim KY, 2022. The Association between Working Posture and Workers' Depression. In Healthcare Multidisciplinary Digital Publishing Institute. Healthcare (Basel). Vol. 10, No. 3, p. 477 DOI: 10.3390/healthcare10030477

7. Cagnie B, Danneels L, Van Tiggelen D, De Loose V, Cambier D, et al, 2007. Individual and work-related risk factors for neck pain among office workers: A cross-sectional study. European Spine Journal. 16(5):679-86. DOI: 10.1007/s00586-006-0269-7

8. Eltayeb S, Staal JB, Hassan A, de Bie RA, et al, 2009. Work-related risk factors for neck, shoulder and arms complaints: A cohort study among Dutch computer office workers. J Occup Rehabil 19: 315-322. DOI: 10.1007/s10926-009-9196-x

9. Kibler WB, McMullen J, 2003. Scapular dyskinesis and its relation to shoulder pain. J Am Acad Orthop Surg 11: 142-151. DOI: 10.5435/00124635-200303000-00008

10. Mahmud N, Bahari SF, Zainudin NF, et al, 2014. Psychosocial and Ergonomics Risk Factors Related to Neck, Shoulder and Back Complaints among Malaysia Office Workers. International Journal of Social Science and Humanity 4: 260-263. DOI: 10.7763/IJSSH.2014.V4.359

11. Andersen JH, Kaergaard A, Frost P, Thomsen JF, Bonde JP, et al, 2002. Physical, psychosocial, and individual risk factors for neck/shoulder pain with pressure tenderness in the muscles among workers performing monotonous, repetitive work. Spine (Phila Pa 1976) 27: 660-667. DOI: 10.1097/00007632-200203150-00017

12. Thigpen CA, Padua DA, Michener LA, Guskiewicz K, Giuliani C, et al, 2010. Head and shoulder posture affect scapular mechanics and muscle activity in overhead tasks. J Electromyogr Kinesiol 20: 701-709. DOI: 10.1016/j.jelekin.2009.12.003

13. Kim KS, Kim MG, 2010. Gender-related Factors Associated with Upper Extremity Function in Workers. Saf Health Work 1: 158-166. DOI: 10.5491/SHAW.2010.1.2.158

14. Kibler WB, Ludewig PM, McClure PW, Michener LA, Bak K, Sciascia AD, et al, 2013. Clinical implications of scapular dyskinesis in shoulder injury: the 2013 consensus statement from the 'Scapular Summit'. British journal of sports medicine, 47(14), pp.877-885. DOI: 10.1136/bjsports-2013-092425

15. Kumar A, Kamath S, 2019. Rapid upper limb assessment (RULA): validity and reliability evidences in identifying workplace ergonomics among bank employee's using computers. Revista Pesquisa em Fisioterapia, 9(2), pp.194-203. DOI:10.17267/2238-2704rpf.v9i2.2320

16. MOUSSAVI NSA, Mirzaei R, 2012. Evaluation of upper limb musculoskeletal loads due to posture, repetition, and force by rapid upper limb assessment in a textile factory. J Health Scope. pp.18-24. DOI:10.5812/jhs.4532

17. Sonne M, Andrews DM, 2012. The Rapid Office Strain Assessment (ROSA): Validity of online worker self-assessments and the relationship to worker discomfort. Occupational Ergonomics, 10(3), pp.83-101. DOI: 10.3233/OER-2012-0194

18. Rodrigues MSA, Sonne M, Andrews DM, Tomazini LF, de Oliveira Sato T, Chaves TC, et al, 2019. Rapid office strain assessment (ROSA): Cross-cultural validity, reliability and structural validity of the Brazilian-Portuguese version. Applied ergonomics, 75, pp.143-154.DOI: 10.1016/j.apergo.2018.09.009

19. Basakci Calik B, Yagci N, Oztop M, Caglar D, et al, 2022. Effects of risk factors related to computer use on musculoskeletal pain in office workers. International Journal of Occupational Safety and Ergonomics, 28(1), pp.269-274. DOI: 10.1080/10803548.2020.1765112

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