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Risk factors of occupation related back pain and neck pain among patients attending tertiary care hospital, Ahmedabad, India

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Keywords

Back pain • Neck pain • Occupation • Risk factors

Summary

Introduction. *Neck/back pain is one of the common health problems associated with significant impact on health resulting in sickness absenteeism. Neck/back pain is one of important causes of disability adjusted life years worldwide. The objectives of study were: To identify various occupations related risk factors and their possible role in occurrence of back pain/neck pain and visual analogue scale(VAS) assessment of their perceived pain.*
Methods. *The study was conducted at one of the tertiary care hospital at Ahmedabad city, India. All patients above age of 18 years attending physiotherapy department for treatment of back pain/neck pain and gave consent were taken as study participants.Information about certain body postures in their lifestyle or at workplace which can have effects on back pain/neck pain were asked. VAS for perceived pain was anchored by "no pain" (score 0) and "pain as bad as it could be" (score 100). Data were entered in MS Excel and analyzed by frequency, contingency coefficient and Goodman and Kruskal's Gamma test.*
Results and Conclusion. *Total of 512 participants were included in study, among which(10.3%)and 392 (76.6%) participants had neck pain and back pain alone, respectively, while 67 (13.1%) participants had both neck and back pain. Age, marital status, socioeconomic class, body mass index and type of occupation revealed statistically significant association with severity of pain. Among participants with prolonged computer usage, back rest fitting to natural back curve and adjustable height of chair were significant factors for occurrence of neck pain.Various body postures like prolonged sitting/ standing, frequent bending at waist/ knee, pulling/pushing heavy objects, frequent weight lifting > 10 kg and repetitive movements of back/neck revealed as statistically significant risk factors for back/neck pain.*

Introduction

It has been estimated that between 70% and 85% of the population will have a back problem of some kind in their lifetime, and while many of these problems may be short term, some develop into a chronic condition with serious ramifications [1]. One similar research with meta-analysis suggested that pooled estimate for the occurrence of work absence in workers with back pain was 15.5% [2]. Occupational low back pain is the largest single health problem related to work and absenteeism at most common cause of incapacity among workers aged less than 45, it primarily affects young adults and is responsible for approximately one quarter of all cases of premature invalidity [3]. It has been estimated that 5-10% of cases of spinal pain become chronic [4, 5] and one fifth lead to pain-related disability one year after the first pain episode [6]. The global point prevalence of neck pain is estimated to be 4.9% with Disability-adjusted life years to 33.6 million in 2010. Out of all 291 conditions studied in the global burden of disease 2010 study, neck pain ranked 4th highest in terms of disability as measured by years lived with disability [7]. Low-back pain and neck pain are the biggest and fourth biggest causes of years of life with disability worldwide, respectively [8]. Back pain is one of the most frequent reasons for visiting a general practitioner or physiotherapists [9].
Risk indicator for back pain includes age, gender, education level, weight, height, right or left handed, number of children, smoking habits, body mass index, regular physical exercise, driving time, job, duration of work time, work time a week, manual lifting of heavy weights and uncomfortable static and awkward working positions, heavy physical work, night shifts, bending, twisting, pulling, and pushing and psychosocial factors like Perceived high pressure on time and workload, low job control, job dissatisfaction, monotonous work, and low support from co-workers and management [10, 11].
Studies suggest that between 60% and 90% of people will suffer from low back disorders at some point in their life and that at any one time between 15% and 42% of people are suffering (depending on the study population and the and the definition of back pain used). Data from the European survey on working conditions reveal that 30% of European workers suffer from back pain, which tops the list of all reported work related disorders [12]. Pain, discomfort and loss of function in the back, neck and extremities are common among working people [13].
The problems of back pain or neck pain are commonly neglected in initial stages by community mainly due to

its nonfatal course until it becomes excruciating. Even upon request of detailed investigation for diagnosis by treating doctors, patients are compelling to limit the treatment with painkillers or self-treat themselves. This behaviour has adverse impact on their health later on including sensory or motor disturbances of affected limb.

Objectives of the study were: 1) To identify various occupations related risk factors and their possible role in occurrence of back pain/neck pain and 2) To appreciate role of computer job work on occurrence of back pain/neck pain.

Methods

The present study was conducted at one of the tertiary care hospital attached with medical college at Ahmedabad city, Gujarat, India. All patients above age of 18 years attending physiotherapy department of the institute for treatment of back pain/neck pain and willing to give informed oral consent were taken as study participants. The study was conducted from August 2017 to March 2018 and following convenient sampling size, all patients who gave oral informed consent were included in study. In present study, a total of 512 participants were included. After necessary permission, pilot study was conducted among 30 patients and then questionnaire was finalized. It included sociodemographic details, assessment of various occupation related risk factors, information regarding current/past episodes of back pain/neck pain and treatment being undertaken.

Socio-economic classification was based on Modified Prasad Classification. Modified Prasad Classification is calculated using latest available All India-Consumer Pricing Index (Industrial Worker) [14] and correction factor of 1981 and 2001. Formula to obtain multiplication factor for month of May 2018 is:

MF= AICPI of May 2018 * 4.63 * 4.93 / 100

The multiplication factor that was obtained with above formula is multiplied with baseline classification values. Hence, the latest classification was revealed.

Information about certain body postures in their lifestyle or at workplace which can have effects on back pain/neck pain were asked. Details are given in Table I.

Visual Analogue Scale (VAS) for perceived pain was included in proforma. For pain intensity, the scale is most commonly anchored by "no pain" (score of 0) and "pain as bad as it could be" or "worst imaginable pain" (score of 100 [100-mm scale]) [20]. Pain score was further divided in 2 and 3 categories : Not Severe (1-6) and Severe (7-10) and Mild (1-3), Moderate (4-6) and Severe (7-10). Necessary approval from institutional ethical committee was obtained. Personal interview of all participants were carried out at physiotherapy department of institute. Data were entered in MS Excel and analyzed using IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp. For statistical analysis of data, tests like contingency coefficient, Cramer's V, Odds ratio and Goodman and Kruskal's Gamma test are applied.

Results

Total of 512 participants were included in present study. General characteristics of participants are given in Table II.

When inquired amongst all the participants, 53 (10.3%) participants had Neck pain, 392 (76.6%) participants had back pain and 67 (13.0%) participants were suffering from both neck pain and back pain. Upon asking details of referred pain: amongst the 120 participants with complaint of neck pain, 19 (15.8%) had shoulder pain, 102 (85.0%) had radiating pain in upper limb, out of which 54 (52.9%), 38 (37.3%) and 10 (9.8%) had radiating pain in right upper limb, left upper limb and bilateral upper limb respectively. In same subset of patients, Tingling (92, 76.7%) and numbness (88, 73.3%) in upper limb complaint were also reported. In 459 participants with complaint of back pain, radiating pain in lower limb was present in 326 (71.0%) participants. Tingling and numbness in lower limb was presented by 105 (22.9%) and 136 (29.6%) patients, respectively. Onset of pain in 207 (40.4%) participants was sudden, while in 305 (59.6%) participants it was gradual and pain increased over period of time. 380 (74.2%) participants had continuous pain which remained almost throughout the day, while 132 (25.8%) participants had intermittent pain. On inquiring about past medical history related to back pain, it was found that out of 512 participants, 70 (13.7%) had received spinal anesthesia, 171 (33.4%) had suffered from trauma at back and 2 (0.4%) had congenital deformity of spine. Lifting heavy weights as a part of job which may be on flat surface, on slop or on staircase was informed by 191 (37.30%) participants.

Tab. I. Information about various body postures and their ideal positions in lifestyle.

Various body postures	Ideal position
Ideal method to use pillow during sleep	Push down pillow next to shoulders but not lay shoulders on pillow. Head should be level when it's on pillow. The pillow should not be so thick that chin is tucked into chest, or not so flat that chin is elevated in air. Pillow should maintain natural curvature of spine [15-17]
Position of armrest while using computer	Proper position of armrest is below elbow, when elbow are at right angle to shoulder. Ideally elbow should not bear weight on armrest while using computer [18]
Height of chair while using computer	Proper height of chair is one in which monitor of computer is at level of eye or few inches above, feet are flat on the floor and knees in line or slightly lower than hips [19]

Tab. II. General characteristics of study participants.

Variable	Sub-category	n = 512 (%)
Age (in completed years)	18-25	35 (6.8%)
	26-35	127 (24.8%)
	36-45	142 (27.7%)
	46-55	111 (21.7%)
	> 55	97 (18.9%)
Gender	Male	192 (37.5%)
	Female	320 (62.5%)
Education status	Illiterate	74 (14.5%)
	Primary	111 (21.7%)
	Secondary	118 (23.0%)
	Higher Secondary	90 (17.6%)
	Graduate and above	119 (23.2%)
Marital status	Unmarried	49 (9.6%)
	Married	403 (78.7%)
	Divorced/widowed/separated	60 (11.7%)
Occupation	Non-worker	52 (10.2%)
	Household work	172 (33.6%)
	Business	53 (10.4%)
	Labourer	78 (15.2%)
	Service	86 (16.8%)
	Tailor	63 (12.3%)
	Others	8 (1.5%)
Socio-economic class (modified Prasad classification)*	I	66 (12.9%)
	II	190 (37.1%)
	III	124 (24.2%)
	IV	104 (20.3%)
	V	28 (5.5%)
BMI	Normal or underweight	293 (57.2%)
	Overweight	156 (30.5%)
	Obese (Class I, II, III)	63 (12.3%)

* AICPI – Industrial worker for month of May 2018-289 [14].

On asking about continuous neck position during work (more than 4 hours without rest in between of at least 30 minutes), 114 (22.3%) participants told that their neck was flexed, 72 (14.1%) told that it was straight, 312 (61.0%) told that it was either flexed or straight most of time, 5 (1.0%) told it was extended while 9 (1.6%) told that it was flexed or rotated most of time. Same way, upon in terms of continuous position of back (more than 4 hours without rest in between of at least 30 minutes) during work, 81 (15.8%) participants told that position was flexed, 152 (29.7%) told it was straight, 264 (51.6%) told it was flexed or straight and 15 (2.9%) told it was flexed or straight or rotated most of time. Upon asking about maintaining ideal body posture of forward head and shoulder position at work, 67 (13.1%) participants told that they were able to follow the ideal posture. The mode of conveyance to workplace revealed: Auto rickshaw (n = 232), Two wheeler (n = 141) and public transport (n = 127) were commonly used as modes of transportation by participants besides bicycle (n = 63) and car (n = 40).

Out of total 512 study participants, 269 (52.5%) participants waited for 1 month or more before consulting a specialist for pain. 416 (81.3%) participants underwent 1-3 consultation with doctors in last one year. 348 (68%) participants were still undiagnosed for the root cause of their pain. From all, 343 (67.0%) participants informed that their pain never subsided even on using some remedy for it. Majority participants - 454 (88.7%) used non steroidal anti inflammatory drugs (NSAIDs) alone or in combination with other drug for relieving pain. Of all the participants taking medication, 409 (79.9%) participants regularly consumed medication for relieving pain. Of total, 33 (6.4%) participants were advised surgical intervention for their spinal problem but they refused, while 2 (0.4%) underwent surgical intervention for their spinal problem. 498 (97.3%) participants took Out-patient service for their problem and had no history of hospitalization due to back pain or neck pain. The participants who were prescribed lumbar belt for back pain were 170 (37.0%) while, 4 (3.3%) were prescribed cervical collar for their neck pain, which was mostly worn during working hours. As a treatment part, 175 (34.2%) participants were advised exercise at home, out of which 155 (88.6%) participants did it regularly. Out of total, 311 (60.7%) participants used some home remedy method to relieve pain. The various house-hold

methods utilized by these participants were: electric heating pad - 39 (12.5%), hot water bag - 269 (86.5%) and vibrating massager - 3 (1.0%).

Participants, who suffered from restriction in some activities due to their pain, were 466 (91.0%). Of total, 99 (19.3%) participants suffered from loss of working days in last year due to their pain. Preventive measure in terms of avoiding specific posture which aggravated the pain was applied by 454 (88.7%) participants. Out of 120 participants suffering from neck pain, 28 (23.3%) participants had habit of using hard and thick pillow during sleep, while 92 (76.7%) used soft and thin pillow. Only 19 (15.8%) participants knew about correct method of using pillow.

On inquiring about prolonged use of computer at workplace, 50 (9.8%) participants used computer at work place for more than 4 hours duration. Out of 50 participants, 32 (64.0%) participants informed that monitor of computer was at the level of eye. 20 (40.0%) participants told that backrest was according to natural curve of the body. 26 (52.0%) participant had chair whose height could be adjusted according to user. The participants using reclining chair were 25 (50.0%) with 42 (84.0%) having armrest of chair proper.

Pain score of all participants categorized as per Visual Analogue Scale (VAS) as described in methodology. Out of total, 89 (17.4%) participants were included in Mild (1-3) pain score category while 286 (55.9%) and 137 (26.7%) participants were included in Moderate (4-6) and Severe (7-10) pain score category, respectively.

Association between general characteristic of study participants and pain score categories was analysed using Gamma test of significance and Contingency coefficient. The characteristics which found to have statistical significance were: age, marital status, socio-economic class, BMI and occupation of participants. No statistical significance was revealed in association between gender, education and severity of pain score (Tab. III). No

Tab. III. Association between general characteristic of study participants and pain score categories.

Variable		Pain score			Total N = 512 (100%)	Gamma (p value)
		Mild (1-3) N = 89 (17.4%)	Moderate (4-6) N = 286 (55.9%)	Severe (7-10) N = 137 (26.7%)		
Age	18-25	10 (11.2%)	12 (4.2%)	13 (9.5%)	35 (6.8%)	0.155 (0.003)
	25-35	29 (32.6%)	62 (21.7%)	36 (26.3%)	127 (24.8%)	
	35-45	18 (20.2%)	86 (30.1%)	38 (27.7%)	142 (27.7%)	
	45-55	17 (19.1%)	55 (19.2%)	39 (28.5%)	111 (21.8%)	
	≥ 55	15 (16.9%)	71 (24.8%)	11 (8.0%)	97 (18.9%)	
Gender	Male	63 (70.8%)	65 (22.7%)	64 (46.7%)	192 (37.5%)	4.789 (0.091)
	Female	26 (19.2%)	221 (77.3%)	73 (53.3%)	320 (62.5%)	
Education	Illiterate	5 (5.6%)	46 (16.1%)	23 (16.8%)	74 (14.5%)	0.081 (0.152)
	Primary	24 (26.9%)	60 (21.0%)	27 (19.7%)	111 (21.7%)	
	Secondary	17 (3.3%)	60 (21.0%)	41 (29.9%)	118 (23.0%)	
	Higher secondary	24 (26.9%)	53 (18.5%)	13 (9.5%)	90 (17.6%)	
	Graduate and above	19 (21.3%)	67 (23.4%)	33 (24.1%)	119 (23.2%)	
Marital status	Unmarried	0(0.0%)	28 (9.8%)	21(15.3%)	49 (9.6%)	0.329 (0.000)
	Married	68(76.4%)	235(82.2%)	100(73.0%)	403 (78.7%)	
	Divorced/widowed/ separated	21 (23.6%)	23 (8.0%)	16 (11.7%)	60 (11.7%)	
Socio economic class	I	9 (10.1%)	46 (16.1%)	11 (8.0%)	66 (12.9%)	0.128 (0.026)
	II	45 (50.6%)	91 (31.8%)	54 (39.4%)	190 (37.1%)	
	III	16 (18.0%)	83 (29.0%)	25 (18.3%)	124 (24.2%)	
	IV	14 (15.7%)	54 (18.9%)	36 (26.3%)	104 (20.3%)	
	V	5 (5.6%)	12 (4.2%)	11 (8.0%)	28 (5.5%)	
BMI	Normal or less than normal	61 (68.5%)	156 (54.5%)	76 (55.5%)	293 (57.2%)	0.141 (0.039)
	Overweight	25 (28.1%)	90 (31.5%)	41 (29.9%)	156 (30.5%)	
	Obese	3 (3.4%)	40 (14.0%)	20 (14.6%)	63 (12.3%)	
Occupation	Business	8 (9.1%)	30 (10.5%)	15 (10.9%)	53 (10.4%)	0.269* (0.000)
	Service	10 (11.2%)	64 (22.4%)	12 (8.8%)	86 (16.8%)	
	Labourer	16 (18.0%)	35 (12.2%)	27 (19.7%)	78 (15.2%)	
	Household work	46 (51.7%)	82 (28.7%)	44 (32.1%)	172 (33.6%)	
	Non workers	5 (5.6%)	33 (11.5%)	14 (10.2%)	52 (10.2%)	
	Tailor	2 (2.2%)	39 (13.7%)	22 (16.1%)	63 (12.3%)	
	Other	2 (2.2%)	3 (1.0%)	3 (2.2%)	8 (1.5%)	

* contingency coefficient value

statistical significance was found between lifting heavy weights at work and severity of pain (5.105; p = 0.078). Statistical significance was found between computer use and pain score severity (0.149; p = 0.003) on applying contingency coefficient test. Statistical significance was found between various risk factors associated with prolonged computer use at work place which can cause back/neck pain. (Tab. IV).

Various body postures like prolonged sitting, prolonged standing, frequent bending waist and knee, pulling/pushing heavy objects, frequent heavy weight lifting > 10 kg (for back pain only), prolonged walking and/or standing and repetitive movement of back/neck (for neck pain only) were found to be statistically significant risk factors for occurrence of back/neck pain. (Tab. V).

Discussion

In present study, it is quite evident that there is relation between occupations related risk factors and back pain and neck pain. Majority of participants attending physiotherapy clinic for spinal problem belonged to working age group of 26-55 years which is statistically significant with pain score. Some other studies in physiotherapists also showed that initial onset of work related back pain occurred before the age of 30 years [21-23]. No statistical association was obtained in the present study between gender, education of participant and severity of pain score. However some studies have reported association between gender and spinal problems, in which it was more common problem among females [24-28].

In case of Body Mass Index, severity of pain was more among obese people compared to other two groups, which is statistically significant. This supports various studies showing that spinal problem is more among obese people compared to normal or overweight people [29, 30]. Yue et al. [31] in their study at China among teachers, found that severity of neck and shoulder pain was more severe among females compared to males. In another study global burden of lower back pain (LBP) showed that LBP was more common among males than females [32]. However in present study, no such significance was obtained between severity of neck and/or back pain and gender. In the same study Yue et al. [31], revealed that neck and shoulder pain was associated with physical exercise, prolonged standing, prolonged sitting and static posture, while lower back pain was associated with twisting posture, uncomfortable back support, prolonged sitting and static posture. Similarly in current study, prolonged sitting and standing, frequent bending at waist and knee, pulling and pushing of heavy objects, prolonged walking and/or standing, prolonged neck bending and repetitive movements and lifting heavy weights were found to be significant factors associated with neck/back pain (Tab. V).

In present study, it was revealed that participants with prolonged computer usage had more severe pain compared to others. All 50 patients using computer, had either moderate or severe back/neck pain. None of them had mild pain. No significant association was found between position of monitor at level of eyes, back rest whether reclining or non-reclining, armrest proper or not, height of chair proper or not and score of severity of pain. This possibly may suggest that unless moni-

Tab. IV. Association between risk factors associated with "computer use" at workplace and pain score categories.

Variable			Pain score			Total N = 50 (100%)	Contingency coefficient value (p value)
			Mild (1-3) N = 0 (0.0%)	Moderate (4-6) N = 34 (68.0%)	Severe (7-10) N = 16 (32.0%)		
Risk factors associated with Computer use	Screen of Monitor at level of eye	Yes	0 (0.0%)	20 (58.8%)	12 (75.0%)	32 (64.0%)	0.155 (0.351)
		No	0 (0.0%)	14 (41.2%)	4 (25.0%)	18 (36.0%)	
	Back rest fitting to natural back curve	Yes	0 (0.0%)	10 (29.4%)	10 (62.5%)	20 (40.0%)	0.301 (0.034)
		No	0 (0.0%)	24 (70.6%)	6 (37.5%)	30 (60.0%)	
	Adjustable height of chair	Yes	0 (0.0%)	14 (41.2%)	12 (75.0%)	26 (52.0%)	0.301 (0.035)
		No	0 (0.0%)	20 (58.8%)	4 (25.0%)	24 (48.0%)	
	Back rest	Reclining	0 (0.0%)	15 (44.1%)	10 (62.5%)	25 (50.0%)	0.169 (0.364)
		Non-reclining	0 (0.0%)	19 (55.9%)	6 (37.5%)	25 (50.0%)	
	Arm rest	Proper	0 (0.0%)	31 (91.2%)	11 (68.8%)	42 (84.0%)	0.274 (0.092)
		Improper	0 (0.0%)	3 (8.8%)	5 (31.2%)	8 (16.0%)	
	Height of chair	Proper	0 (0.0%)	18 (52.9%)	11 (68.8%)	29 (58.0%)	0.148 (0.365)
		Improper	0 (0.0%)	16 (47.1%)	5 (31.2%)	21 (42.0%)	

Tab. V. Association between different body postures at variety of occupations and complaint of back/neck pain.

Body posture	Complaint		Business	House-hold work	Labourer	Non worker	Service	Tailor	Others	Total	p-value
Prolonged sitting (n = 381)	Neck pain	No	32 (10.8%)	103 (34.8%)	32 (10.8%)	23 (7.8%)	63 (21.3%)	37 (12.5%)	6 (2.0%)	296	0.000
		Yes	7 (8.2%)	32 (37.6%)	11 (12.9%)	0 (0.0%)	8 (9.5%)	26 (30.6%)	1 (1.2%)	85	
	Back pain	No	1 (3.8%)	15 (57.7%)	1 3.8%)	0 (0.0%)	0 (0.0%)	9 (34.6%)	0 (0.0%)	26	0.003
		Yes	38 (10.7%)	120 (33.8%)	42 (11.8%)	23 (6.5%)	71 (20.0%)	54 (15.2%)	7 (2.0%)	355	
Prolonged standing (n = 291)	Neck pain	No	27 (12.8%)	97 (45.5%)	41 (19.2%)	3 (1.4%)	24 (11.3%)	15 (7.0%)	6 (2.8%)	213	0.028#
		Yes	16 (20.5%)	28 (35.9%)	11 (14.1%)	6 (7.7%)	7 (9.0%)	9 (11.5%)	1 (1.3%)	78	
	Back pain	No	3 (9.1%)	13 (39.4%)	4 (12.1%)	6 (18.2%)	7 (21.2%)	0 (0.0%)	0 (0.0%)	33	0.000
		Yes	40 (15.5%)	112 (43.4%)	48 (18.6%)	3 (1.2%)	24 (9.3%)	24 (9.3%)	7 (2.7%)	258	
Frequent bending waist knee (n = 217)	Neck pain	No	5 (3.1%)	74 (46.5%)	48 (30.2%)	4 (2.5%)	5 (3.1%)	16 (10.1%)	7 (4.5%)	159	0.002#
		Yes	1 (1.7%)	30 (51.8%)	11 (19.0%)	6 (10.3%)	8 (13.8%)	1 (1.7%)	1 (1.7%)	58	
	Back pain	No	1 (5.0%)	9 (45.0%)	4 (20.0%)	6 (30.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	20	0.001
		Yes	5 (2.6%)	95 (48.2%)	55 (27.9%)	4 (2.0%)	13 (6.6%)	17 (8.6%)	8 (4.1%)	197	
Pulling/ pushing heavy objects (n = 32)	Neck pain	No	N.A.	8 (32.0%)	11 (44.0%)	0 (0.0%)	N.A.	N.A.	6 (24.0%)	25	0.000
		Yes	N.A.	0 (0.0%)	0 (0.0%)	6 (85.7%)	N.A.	N.A.	1 (14.3%)	7	
	Back pain	No	N.A.	0 (0.0%)	0 (0.0%)	6 (100%)	N.A.	N.A.	0 (0.0%)	6	0.000
		Yes	N.A.	8 (30.8%)	11 (42.3%)	0 (0.0%)	N.A.	N.A.	7 (26.9%)	26	
Frequent heavy weight lifting (n = 195)	Neck pain	No	8 (6.2%)	45 (34.9%)	38 (29.5%)	4 (3.1%)	8 (6.2%)	19 (14.7%)	7 (5.4%)	129	0.260#
		Yes	2 (3.0%)	29 (43.9%)	14 (21.3%)	6 (9.1%)	5 (7.6%)	9 (13.6%)	1 (1.5%)	66	
	Back pain	No	1 (5.0%)	9 (45.0%)	4 (20.0%)	6 (30.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	20	0.000
		Yes	9 (5.1%)	65 (37.1%)	48 (27.4%)	4 (2.3%)	13 (7.4%)	28 (16.1%)	8 (4.6%)	175	
Prolonged walking and/ or sting (n = 122)	Neck pain	No	4 (4.5%)	62 (69.7%)	12 (13.5%)	0 (0.0%)	1 (1.1%)	4 (4.5%)	6 (6.7%)	89	0.000
		Yes	3 (9.1%)	9 (27.3%)	3 (9.1%)	6 (18.2%)	5 (15.1%)	6 (18.2%)	1 (3.0%)	33	
	Back pain	No	1 (10.0%)	0 (0.0%)	3 (30.0%)	6 (60.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	10	0.000
		Yes	6 (5.3%)	71 (63.4%)	12 (10.7%)	0 (0.0%)	6 (5.4%)	10 (8.9%)	7 (6.3%)	112	

continues

Tab. V. *follows.*

Body posture	Complaint		Business	House-hold work	Labourer	Non worker	Service	Tailor	Others	Total	p-value
Prolonged squatting (n = 182)	Neck pain	No	0 (0.0%)	91 (68.9%)	9 (6.8%)	4 (3.0%)	3 (2.3%)	18 (13.6%)	7 (5.3%)	132	0.332
		Yes	1 (2.0%)	33 (66.0%)	6 (12.0%)	0 (0.0%)	0 (0.0%)	9 (18.0%)	1 (2.0%)	50	
	Back pain	No	0 (0.0%)	13 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	13	0.427
		Yes	1 (0.6%)	111 (65.6%)	15 (8.9%)	4 (2.4%)	3 (1.8%)	27 (16.0%)	8 (4.7%)	169	
Neck bending (n = 34)	Neck pain	No	N.A.	9 (40.1%)	3 (13.6%)	3 (13.6%)	1 (4.5%)	0 (0.0%)	6 (27.2%)	22	0.001
		Yes	N.A.	3 (25.0%)	0 (0.0%)	0 (0.0%)	5 (41.7%)	3 (25.0%)	1 (8.3%)	12	
	Back pain	No	N.A.	3 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3	0.001
		Yes	N.A.	9 (29.0%)	3 (9.7%)	3 (9.7%)	6 (19.3%)	3 (9.7%)	7 (22.6%)	31	
Repetitive movement of back/neck (n = 13)	Neck pain	No	N.A.	4 (57.1%)	N.A.	0 (%)	2 (28.6%)	N.A.	1 (14.3%)	7	0.604
		Yes	N.A.	0 (0.0%)	N.A.	6 (100%)	0 (0.0%)	N.A.	0 (0.0%)	6	
	Back pain	No	N.A.	4 (57.1%)	N.A.	0 (0.0%)	2 (28.6%)	N.A.	1 (14.3%)	7	0.604
		Yes	N.A.	0 (0.0%)	N.A.	6 (100%)	0 (0.0%)	N.A.	0 (0.0%)	6	

Contingency coefficient test was applied. Other all variables were assessed by Fisher's Exact test.

tor display is in front and not on either side, pain is not severe. Such conclusion was also made in study conducted by Ye et al. [32] at China. In current research, significant association was obtained between computer use, back rest fitting to natural curve of body, adjustable height of chair and severity of pain score. Severity of pain was more among participants who didn't have proper backrest in chair and amongst those whose chair height couldn't be adjusted. Certain studies have found relation between visual display unit and musculoskeletal disorders and advice for appropriate design of workstation [33, 34] similar findings were revealed in present study.

Conclusion

In age group more than 25 years, distribution of occurrence of neck/back pain has more preponderance for females. Household work has significant contribution in occurrence of neck/back pain. Majority of the participants suffered from restriction in some activities due to their pain, while some participants suffered from loss of working days in last year due to their pain. Age, marital status, socioeconomic class, BMI and type of occupation were found to have statistically significant association with severity of pain. Among participants with prolonged computer usage, back rest fitting to natural back curve and adjustable height of chair were significant factors for occurrence of neck pain. Various body postures like prolonged sitting, prolonged standing, frequent bending waist and knee, pulling/pushing heavy objects, frequent heavy weight lifting > 10 kg (for back pain only), prolonged walking and/or standing and repetitive movement of back/neck (for neck pain only) were found to be statistically significant risk factors for occurrence of back/neck pain.

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Conflict of interest statement

The authors declare no conflict of interest.

Authors' contributions

VRD had conceptualized the topic and study design, VRD, HJK and KNS prepared the questionnaire, all authors have contributed for data collection, HJK, RPS and JT performed data analyses, VRD and RPS wrote the manuscript and the same was reviewed by all authors.

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