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Musculoskeletal complaints are now a growing health problem affecting both adults and young people [1]. Medical students are more likely to be affected by increased workload in wards of hospitals, stress and long study hours leading sedentary life, during the period of their medical training [2]. Besides they are increasingly using computers in teaching and learning [2]. These events are considered modifiable musculoskeletal complaints risk factors that may increase the prevalence of musculoskeletal complaints among medical students. The study sought to assess the prevalence of back complaints among French medical students and to explore the relationship between back complaints and occupational factors in order to provide prevention measures.

A descriptive, cross-sectional multicentre study was conducted between November 2016 and February 2017 in France among medical students in 4th or 5th years who have clinical training in hospital and medical teaching in faculty. A self-questionnaire comprising 25 questions, covering the medical and occupational factors was developed for this study. Musculoskeletal complaints were assessed on the Nordic Musculoskeletal Questionnaire, a valid instrument for epidemiological survey into musculoskeletal disorders (ache, pain, discomfort) [3]. A visual analogue scale (VAS), validated for stress assessment in clinical practice, was used [4]. A cut-off point of 7 was proposed for clinical discrimination between high stress and moderate-low stress [5]. Data collection and analysis were approved by the national data protection authority and by the local 'Ethics Committee' (IRBN642016/CHUSTE).

A total of 786 students (62.6% female) with an average age of 22 years (standard deviation 2.06 years) were enrolled in the study (participation rate of 54%). During the last seven days, the prevalence of neck, upper back and low back were respectively 47.7%, 33.5%, and 49.4%. During

the last twelve months, the prevalence of neck, upper back and low back were respectively 59.0%,46.6%, and 70.1%.

Results from univariate analysis show that, among occupational factors, pace of work with clinical training half-day, a high level of global stress, the daily workload more than 8 hours per day, were associated with back complaints during the last seven days and during the last twelve months (Table 1). However, these associations do not remain significant after multivariate analysis.

We observed a high frequency of neck and lower back complaints and a significant association between back complaints and modifiable occupational factors, such as the pace of work and the level of global stress. Our findings regarding prevalence are consistent with those in the literature. According to Nordic classification medical students were, lifetime prevalence (73.4%), 1-year prevalence (46.1%-59.9%) of low back pain[6]. Active coping is considered a better way to deal with stress than avoidant coping strategies [7,8]. Shearer et al. suggest that a short mindfulness training program can be a powerful yet simple way to help students cope with stress and anxiety [9].

In conclusion, to prevent back disorders among medical students, multidisciplinary actions that include changes in the work environmental factors along with stress management programs that teach people how to cope better with stressful events could be developed in faculties.

Contributions of authors.

All authors have role in conducting the research and writing the manuscript. The final version of this manuscript is approved by all authors.

Disclosure of interest

The authors declare that they are no competing interest.

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		Back complaints on at least one of location during the last seven days							Back complaints on at least one of location during the last twelve months						
		No	Yes	Univariate analysis			Multivariate analysis		No	Yes	Univariate analysis			Multivariate analysis	
		N (%)	N (%)	p-value	OR	CI	OR adj	CI	N (%)	N (%)	p-value	OR	CI	ORadj	CI
Gender	Men	108 (37)	186 (63)	***	1		1		53 (18)	241 (82)	***	1		1	
	Women	96 (19)	396 (81)		1.27	1.15-1.40	1.23	1.11-1.36	45 (9)	447 (91)		1.1	1.04-1.18	1.21	1.09-1.34
Age	<21 years	5 (16)	26 (84)	NS	1				2(6)	29(94)	NS	1			
	[21-22 years[	42 (25)	124 (75)		0.89	0.75-1.06			22 (13)	144 (87)		0.93	0.84-1.03		
	[22-23 years[	85 (28)	217 (72)		0.86	0.73-1.01			39 (13)	263 (87)		0.94	0.84-1.03		
	≥ 23 years	72 (25)	215 (75)		0.89	0.75-1.06			35 (12)	252 (88)		0.94	0.85-1.04		
Seniority in the medical studies	Fourth year	97 (25)	294 (75)	NS	1				47 (12)	344 (88)	NS	1			
	Fith year	107 (27)	288 (73)		0.97	0.89-1.05			51 (13)	344 (87)		0.99	0.94-1.04		
Clinical training schedule	Full-day	48 (34)	94 (66)	*	1				28 (20)	114 (80)	**	1			
	Half-day	156 (24)	488 (76)		1.15	1.00-1.30	/	/	70 (11)	574 (89)		1.11	1.02-1.21	/	/
Taking another job paid	No	163 (27)	451 (73)	NS	1				75 (12)	539 (88)	NS	1			
	Yes	41 (24)	131 (76)		1.04	0.95-1.14			23 (13)	149 (87)		0.99	0.92-1.05		
Previous back disease	No	201 (28)	507 (72)	***	1		1		98 (14)	610 (86)	***	1		1	
	Yes	3 (4)	75 (96)		1.34	1.26-1.43	1.25	1.18-1.34	0 (0)	78 (100)		1.14		1.21	1.12-1.30
level of stress associated with clinical training	Low or moderate	171(27)	455(73)	NS	1				78(12)	548(88)	NS	1			
	High	33(21)	127(79)		1.09	1.0-1.20	/	/	20(12)	140(88)		1	0.94-1.07		
level of global stress	Low or moderate	155(31)	348(69)	**	1		/	/	74(15)	429(85)	*	1			
	High	49(17)	234(83)		1.20	1.10-1.30	/	/	24(8)	259(92)		1.07	1.02-1.13		
the frequenc	< twice a week	108 (26)	311 (74)	NS	1				50 (12)	369 (88)	NS	1			

		Last seven days							Last twelve months						
y of heavy load handling	> twice a week	96 (26)	271 (74)		0.99	0.91-1.08			48 (13)	319 (87)		0.99	0.94-1.04		
Number hours per week to practice sports activities Working hours	<1h	25 (24)	77 (76)	NS	1				18 (18)	84 (82)	NS	1			
	[1-2[h	36 (26)	102 (74)		0.98	0.84-1.14			16 (12)	122 (88)		1.07	0.96-1.20		
	[2-4[h	87 (27)	235 (73)		0.97	0.85-1.10			40 (12)	282 (88)		1.06	0.96-1.17		
	≥4h	56 (25)	168 (75)		0.99	0.87-1.14			24 (11)	200 (89)		1.08	0.98-1.20		
Working hours	<8h	55 (35°)	103 (65)	*	1		/	/	29 (18)	129 (82)	*	1		/	/
	[8-10[	63 (24)	200 (76)		1.17	1.02-1.33	/	/	29 (11)	234 (89)		1.09	1.00-1.19	/	/
	≥10h	86 (24)	279 (76)		1.17	1.03-1.33	/	/	40 (11)	325 (89)		1.09	1.00-1.18	/	/
Screen time per day (per hour)	<1h	4 (26)	11 (74)	NS	1		/	/	3 (20)	12 (80)	NS	1			
	[1h-3h[	79 (25)	234 (75)		1.02	0.75-1.39	/	/	37 (12)	276 (88)		1.10	0.85-1.42		
	[3h-5h[	77 (26)	215 (74)		1.00	0.73-1.37	/	/	34 (12)	258 (88)		1.10	0.85-1.43		
	[5h-7h[	32 (27)	88 (73)		1.00	0.72-1.37	/	/	18 (15)	102 (85)		1.06	0.82-1.38		
	>7h	12 (26)	34 (74)		1.00	0.71-1.43	/	/	6 (13)	40 (87)		1.09	0.82-1.43		

Table: **Relations between back complaints on at least one of the location and socio-occupational, medical factors during the last seven days and the last twelve months**

OR: Odd Ratio; CI: Confidence Interval; ORadj: adjusted Odd Ratio

P-value NS : non significant * p-value<0.05 ; ** p-value<0.01 ;* p-value<0.001 *** p-value< 0.0001**

In the multivariate model on a descending procedure Variables with p-value≤0.3 were included, and variables with p-value<0.2 were kept in the model.