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**Prospective and observational study of COVID-19's impact on mental health and training of young surgeons in France**

*Editor*

The COVID-19 pandemic is an unprecedented situation that puts healthcare professionals across the world under extreme pressure. Indeed, health care workers on the frontline who are directly involved in the diagnosis, treatment, and care of patients with COVID-19 are at risk of developing psychological distress and other mental health symptoms which may indirectly impact patients. Several authors alerted regarding the mental health of healthcare workers in this critical situation<sup>1-3</sup> but none about mental health of young surgeons except in small cohorts<sup>4</sup>. The

availability of a personal Protective equipment was also a big challenge<sup>5</sup> especially in our country. Our aim was to evaluate how COVID-19 impacts on surgical training, workload and mental health of residents and fellows of surgery in France and to determine risk factors of mental health disorders to prevent their consequences.

This study was a national survey, collecting demographic and mental health data from 1001 participants throughout 18 regions from 10<sup>th</sup> of April to May 7<sup>th</sup> of May 2020, in France; only residents and fellows of surgery were eligible. The severity of symptoms of depression, anxiety and insomnia, was assessed by the French version of the PHQ-9, the GAD-7 and the ISI, respectively. We performed a multivariable logistic

regression analysis to identify risk factors associated with mental health disorders.

In this survey, among the 1450 young surgeons asked to participate, we obtained 1001 full answers (69.0%). Responders were equally distributed according to their position in their department: 364 (36.4%) were young residents, 332 (33.2%) were senior residents, 305 (30.5%) were fellows, 484 were males (48.4%) and 517 were females (51.6%). At the time of the survey, 4.2% had a positive test of COVID-19. The personal protective equipment provided by the hospital were considered insufficient by 42.8%. 47.9% felt that their hospital had not adequately trained them to manage COVID-19 patients. 93.5% estimated that COVID-19

**Table 1 Experience of the outbreak from the surgical residents and young surgeons in France**

	COVID positive				Anxiety (GAD-7 score)				Depression (PHQ-9 score)					Insomnia (ISI score)						
	N	Yes	No	p	Normal	Mild	Mode-rate	Severe	p	Normal	Mild	Mode-rate	Mode-rately severe	Severe	p	Absence	Sub-threshold	Mode-rate	Severe	p
Total	1001	42	959		642	252	74	33		593	262	108	27	11		570	316	103	12	
Risk speciality				.115					.063						.148					.271
Yes	495	26	469		305	125	47	18		284	134	51	19	7		269	163	55	8	
No	506	16	490		337	127	27	15		309	128	57	8	4		301	153	48	4	
Personal COVID risk				.009					.060						.079					<.001
Yes	74	8	66		40	21	7	6		37	23	8	3	3		32	23	17	2	
No	927	34	893		602	231	67	27		556	239	100	24	8		538	293	86	10	
COVID risk from the entourage				<.001					.358						.511					.472
Yes	429	9	563		369	150	36	17		347	145	63	12	5		314	191	60	7	
No	572	33	396		273	102	38	16		246	117	45	15	6		256	125	43	5	
Take care of COVID patient				.345					.233						.052					.177
Yes	516	25	491		316	141	42	17		295	140	55	21	5		281	166	61	8	
No	485	17	468		326	111	32	16		298	122	53	6	6		289	150	42	4	
Alcohol and tobacco consumption				1					<.001						.003					.001
Yes	251	10	241		129	81	25	16		122	77	38	10	4		121	86	40	4	
No	750	32	718		513	171	49	17		471	185	70	17	7		449	230	63	8	
Enough personal protective equipment				.016					<.001						<.001					.025
Yes	573	16	557		399	128	32	14		370	142	47	10	4		348	170	50	5	
No	428	26	402		243	124	42	19		223	120	61	17	7		222	146	53	7	
Sufficient training				.431					<.001						<.001					<.001
Yes	522	19	503		369	115	26	12		354	113	41	11	3		329	155	33	5	
No	479	23	456		273	137	48	21		239	149	67	16	8		241	161	70	7	
Change of service				.345					.245						.066					.186
Yes	516	25	491		316	141	42	17		295	140	55	21	5		281	166	61	8	
No	485	17	468		326	111	32	16		298	122	53	6	6		289	150	42	4	

outbreak had a negative impact on their training. Several risk factors were studied (Table 1). Symptoms of anxiety, depression and insomnia were present in 359 (35.9%), 408 (40.8%) and 431 (43.1%) participants respectively and multivariate logistic regression identified 4 risk factors associated with them. Women had more risk to have anxiety: aOR, 1.86; 95 CI, 1.41-2.44;  $p < 0.001$ ; depression: aOR, 2; 95 CI, 1.53-2.62  $p < 0.001$ ; insomnia: 1.61; 95 CI, 1.24-2.08;  $p < 0.001$ . Increased consumption of alcohol or tobacco was more likely to induce anxiety, depression and insomnia: aOR, 2.06; 95 CI, 1.53-2.79;  $p < 0.001$ ; aOR, 1.79; 95 CI, 1.33-2.42;  $p < 0.001$ ; aOR, 1.58; 95 CI, 1.18-2.12;  $p = 0.002$  respectively. On the other hand, enough personal protective equipment and sufficient training about COVID-19 were statistically associated to a decreasing of mental disrupting. For these two parameters, the risk of anxiety was decreased by 31% and 36% respectively (aOR, 0.69; 95 CI, 0.52-0.91;  $p = 0.008$ ; aOR, 0.64; 95 CI, 0.48-0.84;  $p = 0.002$ ). The risk of depression was decreased by 25% and 46% respectively (aOR, 0.75; 95 CI, 0.57-0.99;  $p = 0.04$ ; aOR, 0.54; 95 CI, 0.41-0.71;  $p < 0.001$ ). Only sufficient training was associated with a decrease in of the risk of insomnia by 37% (aOR, 0.69; 95 CI, 0.49-0.83;  $p < 0.001$ ).

Residents and fellows reported a high rate of mental health disorders. Female gender and alcohol and/or tobacco consumption were significant risk factors. Optimal individual protection and training about COVID-19 are both variables which influence on that risk.

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