

# Impact of COVID-19 on Educational and Academic Activities of Health-Care Professionals: An International Survey of Doctors, Dentists and Nurses.

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## Abstract

**Introduction:** The COVID-19 pandemic has affected the whole world in different levels from numerous aspects. This deadly, highly contagious viral infection has led to lockdown in many cities across the world; significantly disrupting previously planned educational activities. **Objectives:** We aim to evaluate the impact of the COVID-19 pandemic on the educational and academic activities of the health care professionals practicing in different countries. **Subjects and Methods:** A cross-sectional survey was conducted using a link to an online questionnaire which was sent to doctors, dentists and nurses working in several countries using WhatsApp medical groups. The questionnaire consisted of eight questions related to the impact of COVID-19 on educational and academic activities of the health care professionals (HCPs). **Results:** 898 responses received from doctors (66.5%), nurses (21%) and dentist (12.5%), working in 36 countries. 66.6% of respondents think their academic activities are less than what it was before the pandemic. However, 63% of participants have attended more webinars and 58% have completed more on-line courses and e-learning sessions during the pandemic. **Conclusions:** COVID-19 pandemic negatively impacted the academic activities of HCPs. However, COVID-19 health crisis created an opportunity for enriching the educational activities

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through e-learning, online courses, and webinars. This experience should be utilized in the future, with more online material available.

**Keywords:** COVID-19, dentists, doctors, education, health-care professionals, nurses, pandemic, academia

## INTRODUCTION

The novel coronavirus (COVID-19) pandemic has caused a major global crisis on different aspects; health, psychosocial,<sup>[1]</sup> economical,<sup>[2,3]</sup> and financial.<sup>[4]</sup> Physical or social distancing was recommended by different health authorities worldwide to contain the outbreak of this deadly infection.<sup>[5]</sup> Some countries had to go through lockdown or curfew phases to manage the spread. Health care professionals (HCPs) remained the frontline soldiers against COVID-19.<sup>[6]</sup> As a result, there was considerable mortality and morbidity among the health workers.<sup>[7]</sup> Most health-care systems worldwide were already understaffed before the pandemic. In 2013, the World Health Organization (WHO) predicted a 12.9 million shortage of health workforce by 2035.<sup>[8]</sup> Furthermore, the most recent announcement by the WHO highlighted a worldwide need for six million more nurses in the next 10 years.<sup>[9]</sup> Hence, any losses caused by the pandemic is going to worsen the already existing staff shortage, affecting the mental health of the surviving colleagues as well as increasing the workload on the overwhelmed staff, therefore shifting the focus on just running the core critical services. Those factors could have percussion on less urgent matters like continuous medical education (CME). However, CME is crucial for safe clinical practice and improving patients' care, by which, it was considered a fundamental requirement to maintain the professional certification.<sup>[10]</sup> CME happens through lectures, seminars, workshops, learning modules, and conferences. The previously planned medical events were either canceled, postponed<sup>[11]</sup> or even converted to virtual mode. Hundreds of meetings rescheduled. Universities, Education centers, and schools benefited to a great extent from the advancement in technology and they have transitioned quickly during this crisis to deliver their educational material online. It was

also reported that scientists have been affected by the COVID-19 health crisis due to stress and work interruption.<sup>[12]</sup> In spite of that, only little is known about the impact on academic clinicians, those active clinicians who are able to diagnose, treat, study, research, innovate, discover, and teach.<sup>[13]</sup> Those whose impact on their specialty is usually measured by the number of their publications and the number of citations of their projects by other researchers.

The primary outcome of this study is to describe the educational and academic activities of HCPs during the first 4 months after declaring the COVID19 pandemic status by the WHO. The secondary outcome is to compare those results between different professions of HCPs and their countries.

## METHODS AND PARTICIPANTS

A cross-sectional survey was conducted. A link to an online questionnaire was sent to doctors, dentists, and nurses working in different countries using WhatsApp medical groups that we are part of. The questionnaire consisted of eight closed type questions related to the impact of COVID-19 on educational and academic activities of the HCPs. It was distributed during June 2020 over 4 weeks. Two reminders were sent toward the last week before the closing date. Statistical analysis was reported by the commercial Survey Monkey website.<sup>[14]</sup> A confidence interval of 95% used with  $P < 0.05$  was considered statistically significant.

## RESULTS

### Demographic and professional profiles of respondents

A total of 898 responses received from 36 countries; in decreasing number of respondents these are: Bahrain, UK, Egypt, KSA, Algeria, Kuwait, Morocco, Iraq, UAE, Oman, Pakistan, Poland, Lebanon, USA, New Zealand, Qatar, Senegal, Albania, Australia, India, Afghanistan, Andorra, Angola, Chile, France, Germany, Guatemala, Italy,

Japan, Jordan, Romania, Singapore, South Africa, Spain, Sudan, and Tanzania. Majority of responses were from the Middle East and North Africa (643, 71.6%). However, the second-most contribution was from the United Kingdom (195, 21.7%), with a small contribution from other European countries, for example, Poland, Germany, France, Spain, and Italy. Therefore, in our analysis, we will provide an overall impression, then we will compare results between three groups of countries, and we will provide a separate analysis based on the profession.

597 doctors (66.5%), 188 nurses (21%) and 113 dentists (12.5%) responded to this survey. 339 (46.5%) are working in adult medicine, while 185 (25.4%) in pediatrics and rest working in disciplines that cover both adult and pediatrics, for example, family medicine and general practice. About 36.1% of the doctors (208) were consultants, 184 (32%) trainees, 166 (28.8%) specialists, 18 (3.1%) fellows, and the rest did not specify their grade.

#### Overall academic activities during COVID-19

724/898 HCPs responded to the questions about the academic activities. The number of completed original articles that have been submitted during the COVID-19 pandemic by this cohort of clinicians reached over 300 articles. 586/724 (80.9%) of respondents did not submit any article. Thirteen clinicians of this cohort managed to submit >5 articles. Two hundred and seventy-five abstracts were submitted during this period, 6 clinicians submitted >5 abstracts. Around 85 editorials were written, more than 5 editorials by 4 clinicians. 535 case reports or CME material were submitted for publication. By which, the total number of submitted manuscripts exceeded 1200.

One hundred and forty reviewers were asked by different medical journals to peer review. Overall, 481/724 respondents (66.6%) felt their activity is less than what it used to be before the pandemic, whereas 241 others (33.4%) had more academic activities than before the pandemic.

#### Educational activities during COVID-19

Compared to pre-pandemic time, 456/724 (63%) respondents attended more webinars, whereas 172/724 (23.8%) had attended less

webinars (120 doctors, 46 nurses, and 6 dentists). Out of those 172, 144 (83.7%) had also fewer academic activities and most of them were specialized in family medicine 28 (16.7%). Those who attended more webinars were based mainly in the United Kingdom (113, 24.8%). Most HCPs who attended more webinars are specialized in endocrinology and diabetes (53, 14%), followed by family medicine (41, 10.8%) and general pediatrics (32, 8.4%). Most of them are either consultants (120, 31.6%) or specialists (115, 30.3%).

419 (58%) completed more online courses or e-learning modules during the pandemic than before, whereas 153 (21.1%) completed less. Those who had less chance to complete online courses or e-learning were mainly specialized in family medicine (26, 17.3%), followed by general pediatrics (19, 12.7%) and obstetrics and gynecology (18, 12%).

#### Regional and international differences and similarities

Table 1 summarizes the comparison between the activities of HCPs from three groups of countries. A reduction of academic activities was observed in all group, whereas the educational activities increased; however, the percentage of increasing webinars and e-learning attendance was lower in the Gulf Cooperation Council countries, compared to the rest of Arab countries and the rest of the world (53.8% vs. 68.9% vs. 73.4%, respectively, for webinars) and (48.6% vs. 60.6% vs. 71.8%, respectively, for e-learning and online courses).

A comparison of academic and educational activities between top 9 responding to Arab countries:

A comparison was made during the analysis between the top 9 Arab responding countries who had at least 10 participants [Table 2]. Most of the responders were doctors.

About 84.8% of Algerian responders thought their academic activities during the COVID-19 crisis is lower than before, and it is significantly worse ( $P < 0.05$ ) than participants from Egypt, Morocco, KSA, and UAE. About 40.4% of the Moroccan and Saudi responders had performed more academic activities during the pandemic, with a statistical significance ( $P < 0.05$ ) more than Algerian and Kuwaiti responders.

**Table 1: Comparison between Gulf cooperation council countries, the rest of Arab countries and the rest of the world**

	<b>GCC countries</b> (Bahrain 207, Saudi Arabia 61, Kuwait 57, United Arab Emirates 38, Oman 34, Qatar 3)	<b>Rest of Arab countries</b> (Egypt 78, Algeria 58, Morocco 53, Iraq 46, Lebanon 6, Jordan 1, Sudan 1)	<b>Rest of the world</b> (UK 195, Pakistan 17, Poland 11, USA 4, New Zealand 3, Senegal 3, Albania 2, Australia 2, India 2 etc.)
Number of participants	400	243	255
Doctors	269	228	100
Nurses	123	12	53
Dentists	8	3	102
Submitted original articles	174	74	53
Submitted abstracts	119	93	63
Written editorials	30	28	27
Submitted case reports/CMEs	260	180	96
Total submissions for publications	583	375	239
Publications:participants ratio	1.45	1.54	0.9
Publications:participants doctors ratio	2.2	1.6	2.4
Number of participants who provided the following details	331	203	188
Academic activities status compared to prior to the pandemic (%)	108, (32.6)↑ 223, (67.4)↓	71, (34.9)↑ 132, (65.1)↓	62, (33)↑ 126, (67)↓
Webinars attended during COVID (%)	178, (53.8)↑ 46, (13.9) - S 107, (32.3)↓	140, (68.9)↑ 23, (11.3) - S 40, (19.7)↓	138, (73.4)↑ 25, (13.3) - S 25, (13.3)↓
Online courses/e-learning attended (%)	161, (48.6)↑ 65, (19.6) - S 105, (31.7)↓	123, (60.6)↑ 50, (24.6) - S 30, (14.8)↓	135, (71.8)↑ 36, (19.2) - S 17, (9)↓

↑: More, ↓: Less, S: Same, GCC: Gulf cooperation council, CME: Continuous medical education, COVID: Coronavirus

About 40.4% of the Moroccan and Saudi responders had performed more academic activities during the pandemic, with a statistical significance ( $P < 0.05$ ) more than Algerian and Kuwaiti responders.

There were generally more webinars attended by participants from these countries. However, the percentage of Kuwaiti responders who attended more webinars (47.3%) was less than the percentage of participants from Egypt (77.1%), UAE (72.2%), Iraq (71.1%), KSA (67.3%), and Morocco (67.3%) with a statistical significance ( $P < 0.05$ ). Nonetheless, 24.6% of Kuwaiti responders continue to attend the same number of webinars in comparison with the time before the crisis. This percentage was significantly higher than responses from Egypt, Morocco, and UAE ( $P < 0.05$ ).

#### Affected activities according to the profession

Doctors submitted 915 manuscripts (original articles, abstracts, editorials, and case reports) compared to 211 from the nurses and 77 from dentists. The number of submitted original articles was higher in the doctors' group. About 93.3% of the dentists (83) had

not submitted articles compared to 91 nurses (83.5%) and 404 doctors (76.8%), ( $P < 0.05$ ).

Dentists had more academic involvement than doctors during the pandemic, 42.7% versus 30.9% ( $P < 0.05$ ). They also had more opportunities to watch webinars than before the pandemic compared to doctors and nurses, 86.5% versus 64.6% and 36.7%, respectively ( $P < 0.05$ ) [Table 3]. 42.2% of the nurses attended fewer webinars during the pandemic compared to doctors and dentists ( $P < 0.05$ ). Similarly, for the e-learning and online courses, as nurses had less of these activities during the pandemic. 40.7% of nurses observed less online educational activities compared to 20% doctors and 4.5% dentists ( $P < 0.05$ ). dentists completed more online courses during this time ( $P < 0.05$ ).

Among the 597 Doctors participated in this survey, 509 answered fully the section regarding their educational activities and on the same time specified their grades, (191 consultants, 153 specialists, 148 residents/trainees, and 17 fellows). The variation of their activities is summarized in Table 4. The webinar attendance rate by specialists (73.9%) was significantly higher than consultants (61.8%)

**Table 2: Comparison between top 9 Arab countries who responded to this survey with minimum number of 10 responses per country**

	Bahrain (%)	Egypt (%)	KSA (%)	Algeria (%)	Kuwait (%)	Morocco (%)	Iraq (%)	UAE (%)	Oman (%)
Number of participants	207	78	61	58	57	53	46	38	34
Doctors	110, (53.1)	75, (96.1)	55, (90.1)	56, (96.6)	49, (86)	52, (98.1)	43, (93.5)	32, (84.2)	21, (61.8)
Nurses	94, (45.4)	2, (2.6)	6, (9.9)	2, (3.4)	3, (5.2)	1, (1.9)	1, (2.2)	6, (15.8)	13, (38.2)
Dentists	3, (1.5)	1, (1.3)	0	0	5, (8.8)	0	2, (4.3)	0	0
Submitted original articles	83	15	21	19	16	20	7	31	12
Submitted abstracts	47	24	14	26	21	23	17	23	13
Written editorials	19	12	1	7	1	1	1	5	3
Submitted case reports/CMEs	123	46	38	41	36	33	48	43	14
Total submissions for publications	272	97	74	93	74	77	73	92	42
Publications:participants ratio	1.31	1.24	1.21	1.6	1.3	1.45	1.58	2.42	1.24
Academic activities status compared to prior to the pandemic (%)	31.4↑ 68.6↓	44.3↑ 55.7↓	40.4↑ 59.6↓	15.2↑ 84.8↓	22.8↑ 77.2↓	40.4↑ 59.6↓	31.6↑ 68.4↓	38.9↑ 61.1↓	33.3↑ 66.7↓
Webinars attended during COVID (%)	46.8↑ 13.5 S 39.7↓	77.1↑ 9.8 S 13.1↓	67.3↑ 11.2 S 21.5↓	58.7↑ 10.9 S 30.4↓	47.3↑ 24.6 S 28.1↓	67.3↑ 9.6 S 23.1↓	71.1↑ 13.1 S 15.8↓	72.2↑ 8.4 S 19.4↓	55.6↑ 7.4 S 37↓
Online courses/e-learning attended (%)	44.2↑ 18 S 37.8↓	73.8↑ 21.3 S 4.9↓	63.5↑ 17.3 S 19.2↓	39.1↑ 32.6 S 28.3↓	42.1↑ 24.6 S 33.3↓	66↑ 20.8 S 13.2↓	58↑ 21 S 21↓	58.3↑ 27.8 S 13.9↓	48.2↑ 11.1 S 40.7↓
COVID 19 positive cases <sup>[15]</sup>	42,132	94,640	280,093	31,972	68,299	26,196	131,886	61,163	79,701
COVID 19 deaths <sup>[15]</sup>	152	4888	2949	1229	461	401	4934	351	483
COVID 19 mortality rate (%)	0.36	5.16	1.05	3.84	0.67	1.53	3.74	0.57	0.61
Physician per 1000 people <sup>[16]</sup>	0.9	0.5	2.6	1.7	2.6	0.7	0.7	2.5	2.0
Nurses and midwives per 1000 people <sup>[16]</sup>	2.5	1.9	5.5	1.5	7.4	1.4	2	5.7	4.2

↑: More, ↓: Less, S: Same, CME: Continuous medical education, COVID: Coronavirus

**Table 3: Impact of coronavirus on academic and educational activities according to the profession based on the received responses**

	Doctors (n=526) (%)	Nurses (n=109) (%)	Dentists (n=89) (%)
Submitted original articles	204	78	19
Submitted abstracts	223	44	14
Written editorials	65	16	4
Submitted case reports/CMEs	423	73	40
Total submissions for publications	915	211	77
Academic activities status compared to prior to the pandemic	163, (31)↑ 363, (69)↓	38↑ 62↓	42.7↑ 57.3↓
Webinars attended during COVID	340, (64.6)↑ 66, (12.5) - S 120, (22.9)↓	40, (36.7)↑ 23, (21.3) - S 46, (42.2)↓	77, (86.4)↑ 6, (6.8) - S 6, (6.8)↓
Online courses/e-learning attended	307, (58.4)↑ 113, (21.6) - S 106, (20)↓	44, (40.3)↑ 21, (19.5) - S 44, (40.7)↓	69, (77.5)↑ 16, (18) - S 4, (4.5)↓

↑: More, ↓: Less, S: Same, CME: Continuous medical education, COVID: Coronavirus

and trainees (59.5%) ( $P < 0.05$ ). Similarly, the percentage of specialists was significantly higher than consultants in attending online courses during this period, 65.4% versus 54.7% ( $P < 0.05$ ). Overall, the submitted material for publication was higher by consultants compared to other grades.

### Affected activities according to speciality

The top three specialties represented in this survey, other than dentistry, were family medicine (95), endocrinology and diabetes (70), and general paediatrics (59). Among these specialties, doctors were 98.9%, 85.4%, and 88.1%, respectively.

**Table 4: Variation between the educational performance of doctors according to their grade, during the pandemic**

<i>n</i> =509	Consultants ( <i>n</i> =191) (%)	Specialists ( <i>n</i> =153) (%)	Fellows ( <i>n</i> =17) (%)	Residents/trainees ( <i>n</i> =148) (%)
Submitted original articles	90	45	4	52
Submitted abstracts	150	70	3	43
Written editorials	30	25	0	7
Submitted case reports/CMEs	198	105	14	92
Total submissions for publications	468	245	21	194
Academic activities status compared to before the pandemic	53, (27.75)↑	51, (33.3)↑	5, (29.4) ↑	48, (32.4)↑
	138, (72.25)↓	102, (66.7)↓	12, (70.6)↓	100, (67.6)↓
Webinars attended during COVID	118, (61.8)↑	113, (73.9) ↑	12, (70.6)↑	88, (59.5)↑
	22, (11.5) S	16, (10.4) S	3, (17.6) S	22, (14.9) S
	51, (26.7)↓	24, (15.7)↓	2, (11.8)↓	38, (25.6)↓
Online courses/e-learning attended	105, (54.7)↑	100, (65.4)↑	11, (64.7)↑	82, (55.4)↑
	39, (20.1) S	30, (19.6) S	3, (17.6) S	39, (26.4) S
	48, (25) ↓	23, (15)↓	3, (17.6)↓	27, (18.2)↓

↑: More, ↓: Less, S: Same, CME: Continuous medical education, COVID: Coronavirus

rest was nurses. Half of the participants in the first two specialties were GPs/consultants, whereas only 13.4% from general paediatrics were consultants. The number of publications was 163 from endocrinology and diabetes, 83 from family medicine, and 52 from general Paediatrics. More webinars were attended by endocrinologists compared to other specialties (67.1% vs. 47% from family medicine and 52% from general pediatrics). Similarly, for the e-learning and online courses as the endocrinologists' attendance was higher with statistical significance ( $P < 0.05$ ).

## DISCUSSION

The COVID-19 pandemic undeniably affected many, leading to mass global disruptions. Part of this had a direct effect on the academic activities of the HCPs, which was already predicted by the UK Department of Health and Social Care, through their guidance to the National Institute of Health Research.<sup>[17]</sup> This survey confirmed that prediction. Two-third of responded HCPs felt their academic activities are less than before the pandemic. For the first instance, people would think there will be more time for academic activities during the pandemic, as elective procedures and preventive visits were deferred, and outpatient clinical activities were markedly reduced. However the fact is, there were new commitments such as a steep rise in the use of telemedicine<sup>[18]</sup> by which clinicians who were not familiar with this method of delivering health care,

they had to develop new skills and start learning from scratch, facing new challenges with patients who are also not used to this way of receiving consultations and treatment advice. With the increasing number of casualties, the number of HCPs were asked to cover critical areas, taking them away from their working places to mitigate the shortage resulted from exposure, illness, and other logistic reasons stopped some HCPs from coming to their duties.<sup>[19]</sup> HCPs during the pandemic are also at high risk of developing posttraumatic stress disorder.<sup>[20]</sup> All the above factors are likely to contribute to taking HCPs away from their academic activities.

HCPs are scattered on a wide demographic setting. Generally, doctors are more based in hospitals, whereas dentists majorly are in general practice setting.<sup>[21,22]</sup> nurses, on the other hand, play an important backbone role and the largest workforce in an epidemic, running day-to-day health-care systems to provide quality and safe care.<sup>[23]</sup> The general assumption of correlating that doctors involvement in education and academic activities is higher in comparison to other HCPs has correctly reflected in our findings.

HCPs that are practicing in general practice settings tend to produce less academic activities; however, they engage in more continual development to maintain their knowledge.<sup>[24]</sup> This study revealed that dentists had significantly attended more webinars (86.5%) and participated in more online

e-learning and courses (77.5%). Whereas, HCPs working in family medicine, with similar settings to the dentists had slightly lower chances to attend more educational sessions during the pandemic (47% more webinars and 48% more e-learning), indicating that type of profession is playing an important factor; perhaps because of differences in the workload, stress, and availability of virtual educational material and platforms. Overall, the academic activities across the specialties and countries were lower than before. This survey provided clear evidence that COVID-19 had negatively affected the academic performance but positively brought more online educational activities, as HCPs attended more webinars and online courses.

Algerian responders self-reported to be performing less academically during the pandemic. Their percentage was the lowest among other Arab countries in the comparison. We noted that the COVID19 mortality rate in Algeria was the second-highest in this group of comparison based on WHO data that was accessed on 5 August 2020.<sup>[15]</sup> The number of physicians per population in Algeria is higher than many other countries in this comparison (1.7/1000 people) versus 0.5 in Egypt and 0.7 in Iraq and Morocco.<sup>[16]</sup> However, looking at the number of publications originated from Algeria, it was the third most common in this group (93) with a publications: participants ratio of 1.6. This may suggest that Algerians are used to be more active academically in the periods before the pandemic and they felt their activities reduced hence their low self-rating compared to the rest of the countries.

The number of publications from UAE (92) was high in relation to the number of respondents (38). The publications: participants ratio was the highest 2.42 in this group for this short period. The UAE is ranked to be the first in the Middle East, the 10<sup>th</sup> on global health-care systems with an efficiency score of 59.7.<sup>[25]</sup>

Remarkably, nurses' activities have significantly dropped in comparison to the others prior to the pandemic. This can be explained by the fact that more nurses were involved in the frontline fight and day-to-day running care, similar to what was

reported in China,<sup>[26]</sup> which had a direct impact on the academic as well as the online presence [Table 3].

The general trend showed that more online webinars, courses, and e-learning modules were taken by doctors and dentists, illustrating the fact that the pandemic has stimulated these professions to keep up to date during this challenging time and resulted in more digital online activity. This digital revolution was thought is likely to stay for higher education<sup>[27]</sup> and we think it is going to stay for HCPs' CME. It is important to recognize the negative impact on the nursing body, as that may impact the health-care delivery on the long run.

This study has several limitations, including the self-reporting, small number of responding HCPs from each country and unfortunately, not all specialties were adequately represented and the fact that results from online surveying could be biased by sampling, online presence, ... etc. In addition, our study did not differentiate between the responses of HCPs based on their direct involvement in caring for COVID19 patients or not and there was no focus on the type of researches in terms of relevance to the COVID19.

## CONCLUSIONS

The purpose of this study was to evaluate the impact of the COVID-19 pandemic on the education and academic activities of the HCPs across different countries. The results showed a general trend in uptake of online activities and webinars, coincided with low academic productivity. Finally, findings suggest that the COVID-19 pandemic had played a two-way role in the global disruption. First, a positive way in enriching the online digital education revolution. Second, a negative impact on academic activities. Therefore, strategies to be put in place for future to minimize disruptions to the education and academic activities of HCPs worldwide. With the abundance of educational material online, effective plans are needed to generously share it and maximally utilize it in future.

## Authors' contributions

HA and HA1 conceptualized and designed the project; KA, FA, AM, MM, SA, NR, IA and FA

contributed to data collection; HA ran the analysis; HA, HA1 and AM drafted the manuscript; AD revised it critically; All authors reviewed the article and approved its final version.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

### Compliance with ethical principles

Ethical approval deemed unnecessary. However, All participants provided consent prior to being able to proceed to the questionnaire. Data were extracted and analyzed anonymously.

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