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Lessons learned: Contribution to healthcare by medical students during COVID-19



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ABSTRACT

An overview of the experiences with deployment of undergraduate medical students in a Dutch university center during the COVID-19 pandemic is provided from organisational and educational perspectives. Medical students' and specialists' experiences during the first peak of COVID-19 underscore the preliminary suggestion that students can be given more enhanced (yet supervised) responsibility for patient care early in their practicums.

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1. Introduction

Indisputably, the 2020 pandemic caused by SARS-CoV-2 virus or coronavirus disease 2019 (COVID-19) is one of the greatest threats to society in the last century. The pandemic has led to a severe health crisis but also caused social, economic and political turmoil. From the medical education perspective, the last time medical school facilities were postponed and enrolment of medical students was slowed down considerably in Western society, was during World War II when medical faculty members were drafted into active military service.

2. Postponement of medical education during COVID-19: The student perspective

Comparably, during the COVID-19 period, the administration formally suspended all medical, educational activities in the university and affiliated hospitals in the Netherlands on March 16th 2020, as part of a Dutch national policy of social distancing in an attempt to halt COVID-19 spread. Apart from the risk of possible transmission, the scarcity of personal protective equipment (PPE) contributed to the decision.

Although acknowledging that the temporary cessation of their education served the public, as well as their healthcare interests, the decision did not come as a relief for many, but as disappointment and frustration for most medical students. Although the personal risk is inherent in medicine, providing care to patients with communicable diseases can be particularly frightening. In practice, we have witnessed many interns halted in their rotations, e.g. in critical care or internal medicine, who indeed expressed great willingness to continue their medical studies on the one hand, and contribute to patient care on the other. In general, the willingness of medical students to voluntarily support the care system during pandemic infectious outbreaks and other disasters is reportedly high [1,2]. For many medical students altruistically serving the societal interest associated with fulfilling their perceived clinical responsibilities seemed to outweigh the medical students' personal risks and hazards. For example, in a recent study from Brazil, this willingness to assist combatting COVID-19 pandemic was most pronounced in senior medical students and appeared driven by duty, altruism, perception of good performance and professionalism values, instead of medical students' interest in learning [3]. In Denmark, all master students and 70% of bachelor students volunteered to contribute to the healthcare workforce within a week during COVID-19. Two-thirds of master students were subsequently working as temporary residents, and more than 30% of bachelor students assisted in emergency departments (ED) [4]. Some graduating US medical students, however, did not consider themselves "essential" workers, especially

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when limited PPE is available, and argued that the ethical obligation to “flatten the curve” supersedes the usual clinical and teaching responsibilities [5].

3. Hospital boards' priority

As the COVID-19 pandemic led to a tremendous burden on medical facilities, each hospital's priority was maintaining and expanding the number of health care professionals and support staff. The pressure build-up on the health care system during the COVID-19 outbreak necessitated rethinking student and resident involvement in patient care from an organisational perspective (instead of merely from a medical education perspective).

Considering the willingness, availability and habited medical knowledge and skills of medical students, this group, in general, appears eminently suited to fulfil at least a supportive role in healthcare during COVID-19. Some authors have drastically proposed to suspend the first year of medical school for a year, and allowing the 20,000 US medical students to join a national health service program [6]. With increasing seniority of the medical student, the nature and level of entrustment decisions regarding clinical activities could be increased in parallel. The so-called fast-tracking of final year medical students resulting in an influx of new physician graduates is another approach, which is practised in the UK and USA [7–9]. Those early graduates that participate have been described by faculty and hospital leadership as “game changers”, since their support has proven critical in allowing redeployment of residents to areas of acute need [9]. It should however be acknowledged that participation in clinical care, even after provisional registration/limited license, is reportedly not obligatory [7], and thus always voluntarily, with adequate supervision where appropriate, and within the competency of the individual student [10]. Unsurprisingly, worldwide, a variable response to medical students' participation has thus been noted. The responses ranged from banning medical students from all clinical activities and tasks, through targeted responses (e.g. denying medical students access to COVID-19 wards, first aid departments or intensive care units (ICUs), to allowing medical students to stay and engage in clinical activities [11]).

4. Student-led initiatives

In the Netherlands, the medical students' willingness to contribute to health care recently became a reality. Most of the initiatives originated from the creative minds of individual medical students or leaders of student organisations. Some focussed on the local (university) hospitals, whereas others quickly expanded their focus to the regional level, also attempting to facilitate the regional healthcare institutions with extra support staff. The limited travel time, and distance for the medical students not living in the direct vicinity of the university, was herein compatible with the social distancing policy during the COVID-19 pandemic. Students interested in voluntarily doing their bit during COVID-19 could express their willingness to help, e.g. by sending a request to a unique e-mail address created by student organisations, or by filling out an enrolment form created by the human resources department of the medical centres. Whereas health care insurance was considered to be covered by the students individually (health care insurance is obligatory in the Netherlands), the human resources department arranged admission agreements, and incapacity insurance for those admitted, as well as a salary compatible with the Collective Labour Agreement of Dutch Universities. Training needs were assessed before admission to the work force. Basic training, for example in acute care principles, was provided either by the Academy for Postgraduate Medical Training of the university hospital or the department in which students were deployed, in collaboration with the Academy for Simulation of the Maastricht University Medical Centre+ (MUMC+), and tailored to individuals' needs [12]. Midway, intervision meetings were arranged in collaboration with the psychosocial team of the hospital.

5. General clinical tasks for medical students

In our university hospital, several tasks were executed by medical students, some indirectly, others directly related to patient care. During all these activities, PPE was provided, as suited for the purpose. A few illustrative examples are mentioned here, as previously described by Bosveld, van Doorn, Stassen & Westerman (2020) [12].

In attempts to minimise the risks for patients and hospital staff, junior undergraduate medical students have been deployed as so-called gatekeepers. Upon entry, medical students stressed that hands disinfection is mandatory for all visitors. Furthermore, they screened all visitors for symptoms and signs potentially indicative of COVID-19, using a checklist. In case of suspected COVID-19, the visitor was advised to revisit the hospital 48-h after full recovery. In case of an unavoidable hospital visit (e.g. a medical specialist asked a patient to the outpatient clinic) the patient was provided with a surgical protective mask and the treating physician or department was informed about the patient's arrival to limit waiting times and contacts.

Likewise, students conveyed and explained the PCR results to patients tested for COVID-19 in the emergency department, or gathered data on COVID patients for future research. The former shares some similarity with call centres, in which common questions of patients and relatives, but also the personnel were addressed by the students.

An example of medical students' roles indirectly related to patient care was the so-called medical scribe. Scribes chart patient-clinician encounters in real-time, in the patient's Electronic Health Record at the direction of a physician or practitioner [13,14], for example in the ED. Whereas a scribe is not directly involved in patient care of COVID patients, thus limiting their exposure, a scribe can nevertheless, for example, prepare and document the patient's prior medical history and prescriptions, call the patient's family practitioner or specialists involved in the patient's care, regarding the patient's prior pre-existing physical condition and subsequently document the information acquired, as well as write preliminary discharge reports. In the ED, the scribes proved very valuable not only to the ED-staff but also for the intensivists being consulted for critically ill patients after a pre-information notice by the ambulance staff. Although it can be envisioned that some clinical experience is essential for medical scribes (limiting this task to senior undergraduate medical students), preparation for their duties can at least in part, also be provided by the use of simulation techniques.

A final example of indirect patient care was the 24/7 live intensive camera observation of COVID-19 patients by a dyad of third and fourth-year undergraduate medical students, using a checklist with criteria to alert attending nurses or physicians.

6. Medical students in the ICU

In the intensive care unit senior undergraduate medical students were directly and indirectly involved in patient care, primarily as supporting staff for nurses. They contributed to daily patient care, washing and shaving patients, changing dressings and lines, taking blood samples, making ECGs, assisting in patient transport, and completing nursing patient charts. Others assisted in turning patients from supine to prone position and vice versa or assisted in performing measurements using Electric Impedance Tomography (EIT) in ventilated patients. In addition, some students had tasks as so-called runners or circulators. This role comprises picking up blood products from the laboratories, assisting in the preparation of materials for insertion of lines, and handing materials in the clean non-COVID areas to nurses and doctors working in non-clean, COVID designated, areas, limiting the use of PPE as well as exposure.

In addition, medical students participated in the intra-hospital advanced life support (ALS)-teams (led by an intensivist or anaesthesiologist), substituting positions normally taken by residents, who were

reallocated to assist in COVID-19 care in the ED, the wards or medium- and intensive-care units.

In the meantime, many students took the opportunity to observe medical procedures, overhear physicians' bedside visits and consultations, during which they asked questions and learned from new patients admitted to their wards, medically cared for by residents, fellows and staff members.

7. What have medical students learned?

Although the examples herein mentioned are limited to the hospital setting, comparable, and undeniably likewise valuable initiatives were also observable in primary- and nursing home care. The exact spin-off of all the above mentioned initiatives regarding deployment of medical students, either in primary-, nursing home-, or hospital care in terms of learning opportunities, engagement, student well-being and learning outcomes, has, however, not yet been subject of formal study. Nowadays, most undergraduate and postgraduate medical training programmes, including intensive care medicine [15], are competency-based, for example using the Canadian Medical Education Directives for Specialists (CanMEDS) [16]. Traditionally, assessment focused on medical knowledge and skills, the CanMEDS domain of the "medical expert". It can however readily be envisioned that for undergraduate medical students during COVID-19, learning at least has also occurred in the CanMEDS competency domains of health advocate, communicator, professional and collaborator, which thus contrasts with the generally more current focus on the medical expert domain. Some reported, for example, that critical thinking skills were boosted, resource management and high-value cost-conscious care were observed in practice, and many moral and ethical dilemmas emerged, providing ample learning opportunities [11]. An overview of tasks executed by medical students during the first COVID-19 peak in our university medical centre and the competency domains to which these experiences contributed from the perspectives of the medical students, is provided in Table 1.

Our medical students' and specialists' experiences during the COVID-19 pandemic underscore the preliminary suggestion that students can be given more enhanced (yet supervised) responsibility for patient care early in their practicums. The COVID-19 pandemic unintentionally appears

to have contributed to the emergence of student-led hospitals, as a variant of student-led clinics in outpatient care [14].

8. What has been learned by the healthcare organisations?

When retrospectively reflecting on the first COVID-19 peak in the Netherlands, lessons can also be drawn from an organisational perspective.

First of all, guidelines by the universities on cessation or continuation of teaching should be complied with by the teaching hospitals, resulting in a uniform, harmonised policy, providing clarity and transparency for both teachers and medical students. After formal cessation of the medical school's teaching activities, subsequent participation in clinical care by medical students is thus always voluntary and is only possible for those who are sufficiently competent for the clinical tasks for which they are deployed. As a consequence, adequate preparatory teaching and training of knowledge, and skills related to caring for COVID-19 patients, provision of all necessary PPE and proper insurance are prerequisite for medical students to engage in clinical practice. In addition, appropriate financial compensation for the medical students' efforts should be offered by the hospitals. It should however be acknowledged that deployment of medical students in clinical practice is not limited to assisting physicians in clinical care, but can also result in support of nurses, and research. Since competence is time and context dependent, regular (de)briefings should corroborate the medical students' competence for the assigned tasks. The dynamic nature of a pandemic such as COVID-19 may at times consequently result in malalignment of hospitals' requests and needs and some of the abovementioned requirements. As a result medical students may variably be deployed in diverse functions and contexts over time.

In summary: our preliminary experiences have revealed that students, apart from the competence medical expert which is normally the focus early during learning, also excelled in addressing, learning and displaying the other, more generic competency domains during COVID-19.

Furthermore, it became apparent that medical students can be given more and earlier, yet supervised responsibility for patient care during their education and training.

Table 1

Examples of tasks performed by medical students in hospital in general and in the intensive care specifically.

Setting	Task	No. of students	Description	Involved CanMEDS competencies
Hospital	Gatekeepers	52	Undergraduate medical students screen visitors upon entrance and provide appropriate PPE	Communicator, health advocate, professional and collaborator
Hospital	Research assistant	3	Undergraduate medical students support taking informed consents and filling out case report forms	Medical expert, communicator and scholar
Hospital	Sampling	12	Undergraduate medical students aid in the execution of PCR-testing and the drawing of blood sample	Medical expert, communicator and professional
Hospital	Communication of PCR-results	10	Undergraduate medical students communicate test results and inform about current isolation rules, regulations and red-flags	Communicator, health advocate and professional
Hospital	Aftercare COVID-19 patients	11	Senior undergraduate medical students determine necessary medical follow-up during telephonic interviews two weeks after discharge and answer questions	Medical expert, communicator, health advocate and professional
Ward and emergency department	Medical scribes	38	Senior undergraduate medical students proactively chart patient-clinician encounters in the patient's Electronic Health Record at the direction of a physician	Communicator, collaborator, manager and professional
Hospital	Monitoring	16	Senior undergraduate medical students observe patients in strict viral isolation (after consent) and alarm nursing staff to limit PPE use	Communicator, collaborator and professional
Hospital	Advanced life support-team	12	Senior undergraduate medical students substitute residents after adequate training in acute life support	Medical expert, communicator, collaborator and professional
Intensive care	Support staff for nurses	23	Senior undergraduate medical students support nursing staff in (newly set-up) intensive care departments	Medical expert, communicator, collaborator and professional
Pharmacy	Preparation of intravenous drugs	7	Senior undergraduate medical students are trained to aid in the preparation of intravenous drugs and help in distribution	Medical expert and professional
General practice centre	Triage of COVID-19 patients	8	Senior undergraduate medical students aiding in the triage of people with COVID-19 patients	Medical expert, communication, organisation and professional

During the first peak of COVID-19, medical students have voluntarily done more than expected from them, and fulfilled their role in health care in general, and the intensive care unit specifically, displaying excellence in professionalism. The medical community applauds their efforts and rests assured that the profession's future is in proficient hands [17].

Financial disclosure

The authors declare not to have any financial and personal relationships with people or organisations that could inappropriately influence this manuscript.

Declaration of Competing Interest

None.

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