Title: Medical Students' Engagement in The Fight Against The COVID-19 Pandemic: Remote Monitoring of Home-Quarantined Patients and Vaccination Teams. Reflections on the Experience and the Learning Outcomes.

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Authors Contribution Statement:

Contributor Role	Role Definition	Authors 1	2	3	4	5	6	7	8
Conceptualization	Ideas; formulation or evolution of overarching research goals and aims.								X
Data Curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse.	X		X	X	X	X	X	
Formal Analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.	X	X	X	X	X	X		
Funding Acquisition	Acquisition of the financial support for the project leading to this publication.								X
Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.	X	X	X	X	X	X	X	X
Methodology	Development or design of methodology; creation of models	X				X	X		
Project Administration	Management and coordination responsibility for the research activity planning and execution.	X	X	X	X	X	X	X	X
Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.								
Software	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.								
Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.								X
Validation	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.								X

Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.	X	X					
Writing – Original Draft Preparation	Creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).	X	X					
Writing – Review & Editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.	X	X	X	X	X	X	

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Discussion Points:

- Medical students' initiatives during the challenging period of #COVID-19Pandemic in #primaryhealthcare
- Senior medical students assisting COVID-19 patients quarantined at home #Quarantine
- Medical students supporting many aspects of the vaccination process in understaffed vaccination centers of large hospitals #COVID-19Vaccine
- Student initiatives in the times of a pandemic. How were Greek medical students involved in the fight against COVID-19?

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ABSTRACT.

Multiple student initiatives were developed in the Medical School of the Aristotle University of Thessaloniki, under the guidance of the Laboratory of Primary Health Care, General Practice, and Health Services Research, as an answer to the increasing needs of the Greek National Health System during the pandemic. In one group, students were responsible for the phone call communication with patients of certain areas to book an appointment for a rapid test, announce the results of the test, monitor the symptoms and the health condition of patients with mild COVID-19 and inform the GPs of the health centers. At around the same time, in another group, senior medical students were enlisted as volunteers, and they were distributed to seven vaccination centers in two different Health Districts of Northern Greece. The vaccination process was significantly facilitated by the support of students in the initial data collection and recording of the personal medical history of the incoming citizens. Supporting the medical staff to accelerate the process, helping to raise public awareness about vaccination, keeping in touch with clinical life and patients, and further training in vaccination and communication skills were cited as critical expectations by the volunteer students, which were largely met. Other schools could implement similar strategies of including medical students in community health projects and promote initiatives that support primary health care.

Key Words: COVID-19 , COVID-19 Vaccines, Undergraduate Medical Education

THE EXPERIENCE.

The Coronavirus Disease 2019 (COVID-19) pandemic has taken an alarming spreading course in the last two years, causing a disruption of conventional medical education.[1-3] The rapid evolution of the pandemic, the scarce medical resources, as well as the increased need for experienced doctors in the overloaded Greek hospitals, dictated that expeditious decisions regarding the training of medical students were to be made. This included a month-long halt of in-person lectures and suspension of senior students' clinical placements in university hospitals, until the curve of COVID-19 cases had been sufficiently flattened once again.

During that time, multiple student initiatives had been developed in the Medical School of the Aristotle University of Thessaloniki, under the guidance of the Laboratory of Primary Health Care, General Practice, and Health Services Research. 5th- and 6th-year medical students showed remarkable motivation and participated in founding COVID-19 response teams, unique in their perspective and participation among all other Medical Schools in Greece. As far as we know, no other Medical School in Greece actively involved students in the battle against the COVID-19.

Overall, the unique perspectives of the initiative are the students' involvement in all parts of it, such as development, organization, implementation, and evaluation of the objectives that were originally set. One of the teams aided the remote monitoring of home isolated patients with mild COVID-19 symptoms, and the other provided vital assistance to the newly founded COVID-19 vaccination centers in Central Macedonia, Greece (Figure 1). In both initiatives, the participating students underwent extensive training regarding the scientific background and the expected outcomes for each team. Simultaneously, the Laboratory of Primary Health Care ensured that they received continuous supervision and assistance in all parts of their involvement. The students' participation in both teams was later evaluated through online questionnaires regarding the educational impact and their experience about the significance of their assisting role.[4] The questionnaires were created by the students in charge of organizing each volunteer team in terms of scheduling and training, with the aid of the Laboratory of Primary Health Care. They included quantitative questions of Likert-type, on a scale of 1-5 (1 = disagree, 5 = agree) and open-ended questions, regarding the benefits, the positive and negative points of the experience at the culmination of the program, which were analyzed quantitatively and qualitatively by the method of thematic analysis. The questionnaire was sent to the correspondents digitally and the questions formulation ensured that correspondents' identification was not possible. No pilot study has been conducted prior to the questionnaires.

The Monitoring of Home-Quarantined Patients' Initiative

The first group (including 13 students) participated in the regular psychological and clinical distance monitoring of home-quarantined patients. Students were responsible for the phone call communication with patients of certain areas to book an appointment for a rapid test, announce the results of the test, monitor the symptoms and the health condition of patients with mild COVID-19 and inform the GPs of the health centers. To accomplish this the students were familiarized with the national protocols and guidelines for handling COVID-19 cases through the guidance of the Professor of Primary Health Care and a General Practitioner (GP) responsible for the project. Afterward, they were subjected to training concerning communication skills, the type of questions

the students should ask the patients, the type of information they were to provide the patients with, and the appropriate information about patients' health they should report to the responsible healthcare personnel. The monitored patients were affiliated with three rural primary health care centers. After being trained, the students were divided into subgroups based on their daily liability for the follow-ups. Following the initiative's culmination, the students filled out a questionnaire about their overall experience. The majority of students agreed that the most significant benefit of distance-monitoring patients with COVID-19 was the improvement of their communication skills. More specifically it was mentioned that the greatest benefit of the participation was the familiarization with international guidelines and protocols for COVID-19, and the sense of contribution to the healthcare system during this challenging period. Some of the students also mentioned the alertness and the team spirit during the difficult times of the pandemic. Concerning what they learned during the weekly reflective meetings, almost all students positively characterized them as valuable. The majority underlined the significance of the feedback they received from other students, obtaining knowledge from each other's comments, the team spirit and the benefits from self-evaluation and reporting of their experience. Finally, regarding how distance-monitoring of patients in primary healthcare could be implemented in the subsequent phases of the pandemic, students indicated that all medical schools in Greece should be involved, that there should be a better use of technology, and that an organized protocol, proper education, and involvement of medical students should also exist.

The COVID-19 Vaccination Initiative

The second initiative aimed at assisting the newly founded vaccination centers from January until late June 2021. By that time, sixty-one senior medical students had become members of the vaccination volunteer team, and they were distributed to seven vaccination centers in two different Health Districts of Northern Greece. Prior to their active involvement, students attended a preparatory training session that informed them about the official procedural guidelines and educated them on possible behavioral and medical case scenarios.[5] Frequent communication with the volunteers was maintained offline and online in reflective meetings. Regarding the students' roles and responsibilities, the vaccination process was significantly facilitated by the support of students in the initial data collection and recording of the personal medical history of the incoming citizens in the understaffed hospitals and primary health care centers that served as main vaccination sites. In suspicion over a vaccine allergy, the students had to inform the nursing personnel to take immediate protective action. Moreover, the students were entitled to fully address any questions or concerns about the vaccination research process, the administration of vaccines, as well as possible future side effects. Finally, they were also in charge of monitoring the patients after the vaccination and until their exit from the vaccination center. As a result, the documentation process was balanced, and the existing medical and nursing personnel could focus on the delivery of vaccinations or even be allocated in other departments.

In addition, many volunteers exercised practical skills such as intramuscular injections or were familiarized with recognizing and treating a possible allergic reaction. Finally, they were trained to be able to address concerns about the vaccines and COVID-19. The overall students' experience and educational outcomes were evaluated through an online questionnaire. Supporting the medical staff to accelerate the process, helping to raise public awareness about vaccination, keeping in touch with clinical life, and further training in vaccination and communication skills were cited as critical expectations by the students, which were largely met. It is impressive

that the motivation of the volunteers and their passion for helping in a large-scale health crisis were not easily bowed by the emerging challenges. They overcame their initial hesitance of a possible exposure to the virus, although many of them lived in their family houses and were afraid of the consequences. Their limited medical role despite their advanced training as graduate students was only reported as a negative experience. According to the final evaluative questionnaire, 91% of those who answered it would participate again in a similar effort or suggest it to their fellow students.

Conclusion

The participation of the students in the volunteer groups exhibited positive outcomes with apparent social effect. This was evident through the local media attention the initiatives received, as well as the growing participation of students from other years if training. Other schools could implement similar strategies of including medical students in community health schemes and promote initiatives that support primary health care, as they proved to help maintain the frequent clinical contact that students need and encourage them to be active members of the professional health community. In addition to the significant assistance provided to the National Health System at a time of utmost need, the involvement in the COVID-19 response teams itself proved to equip the students with the necessary knowledge and medical skills, the practice of which had become extinct due to the limitations imposed on the conventional medical education during the pandemic.

SUMMARY - ACCELERATING TRANSLATION

Η ραγδαία εξέλιξη της πανδημίας COVID-19, οι περιορισμένοι ιατρικοί πόροι και η αυξημένη ανάγκη για έμπειρους γιατρούς στα υπερφορτωμένα ελληνικά νοσοκομεία κατά το τελευταίο έτος, υπαγόρευσαν ότι έπρεπε να ληφθούν σημαντικές αποφάσεις σχετικά με την εκπαίδευση των φοιτητών ιατρικής. Ως αποτέλεσμα, αναπτύχθηκαν πολλαπλές πρωτοβουλίες φοιτητών στην Ιατρική Σχολή του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, υπό την καθοδήγηση του Εργαστηρίου Πρωτοβάθμιας Φροντίδας Υγείας, Γενικής Ιατρικής και Έρευνας Υπηρεσιών Υγείας. Στην πρώτη ομάδα, οι φοιτητές ήταν υπεύθυνοι για την τηλεφωνική επικοινωνία με ασθενείς συγκεκριμένων περιοχών για να κλείσουν ραντεβού για γρήγορο τεστ, να ανακοινώσουν τα αποτελέσματα του τεστ, να παρακολουθούν τα συμπτώματα και την κατάσταση της υγείας των ασθενών με ήπιο COVID-19 και να ενημερώσουν τους γενικούς ιατρούς των κέντρων υγείας. Την ίδια περίπου εποχή, εξήντα ένας τελειόφοιτοι φοιτητές Ιατρικής είχαν γίνει μέλη της εθελοντικής ομάδας εμβολιασμού και είχαν κατανεμηθεί σε επτά κέντρα εμβολιασμού σε δύο διαφορετικές Υγειονομικές Περιφέρειες της Βόρειας Ελλάδας. Η διαδικασία του εμβολιασμού διευκολύνθηκε σημαντικά από την υποστήριξη των φοιτητών στην αρχική συλλογή δεδομένων και την καταγραφή του προσωπικού ιατρικού ιστορικού των εισερχόμενων πολιτών στα υποστελεχωμένα νοσοκομεία και τα κέντρα πρωτοβάθμιας φροντίδας υγείας που λειτουργούσαν ως κύριοι χώροι εμβολιασμού. Η υποστήριξη του ιατρικού προσωπικού για την επιτάχυνση της διαδικασίας, η συμβολή στην ευαισθητοποίηση του κοινού σχετικά με τον εμβολιασμό, η διατήρηση επαφής με την κλινική ζωή και τους ασθενείς, καθώς και η περαιτέρω κατάρτιση σε θέματα εμβολιασμού και επικοινωνιακών δεξιοτήτων αναφέρθηκαν ως κρίσιμες προσδοκίες των εθελοντών φοιτητών, οι οποίες εκπληρώθηκαν σε μεγάλο βαθμό. Άλλες σχολές θα μπορούσαν να εφαρμόσουν παρόμοιες στρατηγικές για τη συμμετοχή φοιτητών ιατρικής σε κοινοτικά προγράμματα υγείας και να προωθήσουν πρωτοβουλίες που υποστηρίζουν την πρωτοβάθμια υγειονομική περίθαλψη. Εκτός από τη σημαντική βοήθεια που παρείχε στο Εθνικό Σύστημα Υγείας σε μια εποχή ύψιστης ανάγκης, η ίδια η συμμετοχή

στις ομάδες αντιμετώπισης του COVID-19 αποδείχθηκε ότι εξόπλισε τους φοιτητές με τις απαραίτητες γνώσεις και ιατρικές δεξιότητες, η πρακτική των οποίων είχε εκλείψει λόγω των περιορισμών που επιβλήθηκαν στη συμβατική ιατρική εκπαίδευση κατά τη διάρκεια της πανδημίας. Άλλες σχολές θα μπορούσαν να εφαρμόσουν παρόμοιες στρατηγικές για τη συμμετοχή των φοιτητών ιατρικής σε κοινοτικά προγράμματα υγείας.

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289 **FIGURES AND TABLES.**

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291 **Figure 1.** The Volunteering Efforts of Medical Students of the Aristotle University of Thessaloniki, Greece, amid
292 the COVID-19 Pandemic. The Organizational Process Through the University's Connections to the Responsible
293 Health Districts and the Delivery of the Final Plan.

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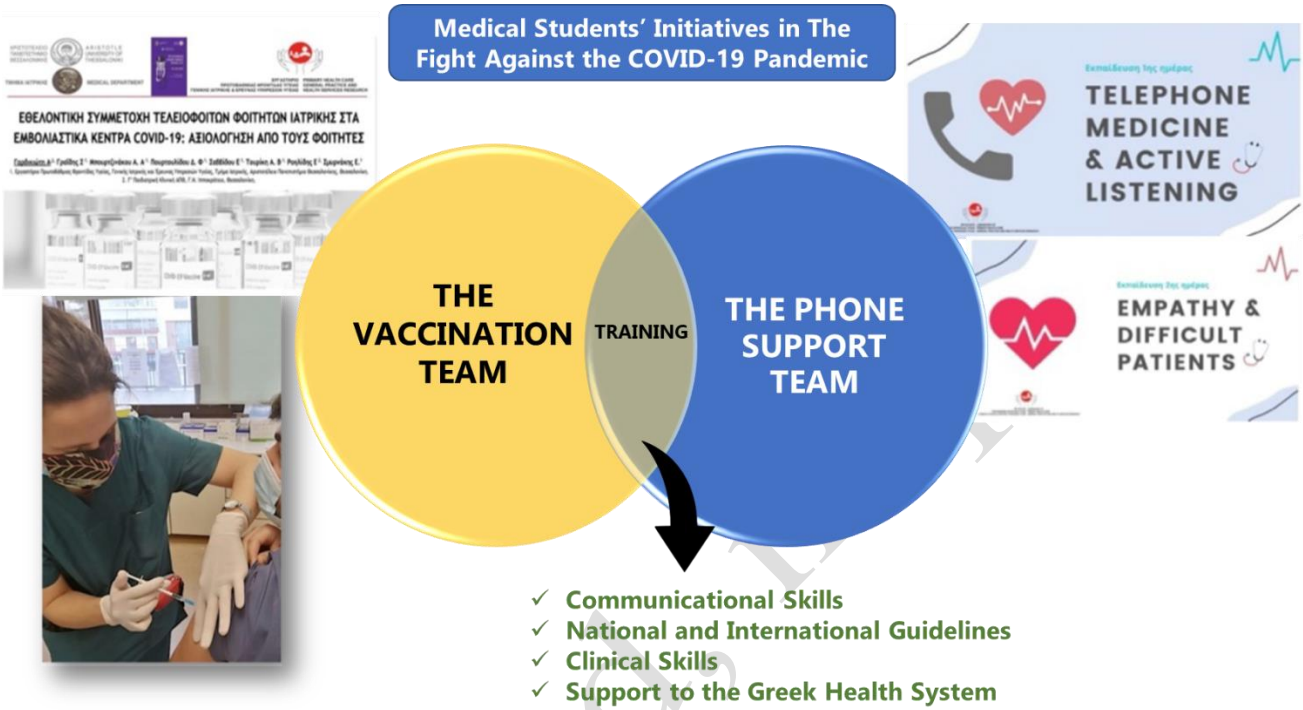

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