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The role of Primary Health Care
System in SARS-CoV2 Pandemic: a
qualitative research based on
interviews that medical students of
Aristotle University of Thessaloniki
conducted with health professionals
working in Health Centers and Local
Health Units.

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Abstract

Introduction: Primary Health Care, the foundation of every health system, obtains a more pivotal role during health emergencies such as the COVID-19 pandemic. During the first stages of the crisis, school as well as university units across the country ceased all educational activities requiring physical presence, with Medical Schools following suit as well. The reopening of on-site clinical training and teaching started for a group of senior medical students of the Aristotle University of Thessaloniki (AUTH), who started their on-site internship in Primary Health Care Units (PHC Units) across Greece.

Aim: The purpose of this study is to showcase the efforts of AUTH senior medical students in gathering and highlighting the thoughts and concerns of PHC professionals in regards to the COVID-19 pandemic.

Population and Methodology: During the easing of lockdown measures of the Hellenic Republic (May 2020), senior medical students were entrusted with an interview guide, put together by the Primary Health Care, General Practice and Health Services Research Laboratory of the AUTH School of Medicine. Students then reached out to healthcare professionals working in PHC Units to take part in semi-structured interviews, based on the respective guide. Interviews were recorded and a transcript was compiled by the students. Subsequently a group of 6 students formed a working group, tasked with analysing the ideas and themes brought up by healthcare professionals as well as decoding a series of closed-ended questions.

Results: A total number of 83 healthcare professionals (including General Practitioners, Nursing staff etc.) from 50 Health Centers and Rural Practices were collected. Four main themes and issues emerged through the working group's analysis:

1. Preparedness of the PHC Units in combating the pandemic
2. Operational aspects of PHC Units (management of chronic conditions, emergency cases, suspected cases, other related issues)
3. Readiness of PHC Units for a possible second wave
4. The role of medical students in the pandemic

The COVID-19 pandemic caught most PHC Units off guard, with personnel shortages, reduced crisis-related training as well as significant shortage of Personal Protective Equipment (PPE). Gradually, the issue of such scarcities, mainly PPE, was resolved.

COVID-19 suspected emergency cases were managed according to guidelines issued by the National Public Health Organisation. At the same time, traffic levels in the emergency departments of PHC Units for non-COVID reasons steeply dived. Management of chronically ill patients fell behind, as outpatient departments and most Rural Practices were put on hold. The only substantial service provided was repeat prescriptions with care for minimizing physical presence as well as non-essential transportation, especially of the elderly population. Intangible e-prescriptions did not enjoy widespread use, as was the case with other real-time patient-doctor telemedicine technology. As far as a possible second wave of COVID-19 pandemic is concerned, a beam of optimism is expressed as the experience and the capacity of PPE could respond to a small-scale wave.

The continuation of training and educational activities for medical students is considered vital for most healthcare professionals, so long PPE and clear student role outline permit. More specifically, complementary to Hospital Units, training in PHC Units equips students with knowledge, skills and attitudes required for holistic patient management in a pandemic.

Conclusion: The COVID-19 pandemic redefined the role of PHC, and PHC Units in our country were quick to realize their potential. Important steps are yet to be taken for the management of the respective population's health needs, with special focus on the systematic follow-up of COVID-19 patients at home, as well as the management of chronic conditions at times when social distancing is deemed necessary. AUTH senior medical students aided in highlighting the current situation as well as drawing useful conclusions for better healthcare management, so that PHC will better respond to such healthcare emergencies in the future.

Key Words

COVID-19 pandemic, Primary Healthcare, Readiness, Second Wave, Undergraduate Medical Education, Medical Students

Introduction

The COVID-19 outbreak originated from the city of Wuhan, Hubei, People's Republic of China. More specifically, a cluster of pneumonia cases was reported to Wuhan health authorities on 31/12/19(1). On 07/01/20 the novel virus was isolated and on 12/01/20 its genetic sequence was shared(2). On 30/01/20 the World Health Organisation (WHO) declared the novel disease outbreak as primary health emergency of international concern (PHEIC) with the declaration of a pandemic following suit on 11/03/20(3,4).

In combating the spread of SARS-CoV-2, the preventive model of social distancing was adopted by most countries, as research showcased its role as a deterrent in viral transmission(5,6). A series of measures were also undertaken, including personal hygiene measures, discontinuation of all in-person educational and non-essential working activities, restrictions in social and religious gatherings as well as limiting all non-essential travel(7,8). Yet, the high number of cases combined with scarcity of both medical personnel and PPE, put an unprecedented burden on National Health Systems, especially on Primary Health Care, in countries such as Italy, Spain and the United Kingdom.

Primary Health Care, the cornerstone of every health system, obtains a more essential role during health emergencies(9). In countries such as Cuba, Brazil and China PHC Units have successfully fulfilled the role of epidemiological surveillance in their respective communities, occasionally utilizing the aid of aware, highly trained medical students. Healthcare workers in those Units executed important tasks including initial examination and management of cases, screening, first aid, preventive temperature checks, diagnostic tests, informing the public about the importance of sanitary measures (proper use of masks, social distancing and prevention of congestion)(10-12). The above data demonstrate that a strong and well-organized PHC acts as a deterrent to the spread of the novel virus, whilst ensuring and promoting population health in periods of crisis.

In general, one could argue that Greece was one of the countries mildly affected by the pandemic, with low levels of viral transmission in comparison with other countries. On 26/02/20 the first confirmed case of COVID-19 was reported, signalling the beginning of the pandemic in Greece(13). At first, initial recommendations were proposed including quarantine of symptomatic patients at home as well as those travelling from countries with high viral load. After the initial measures failed to keep viral transmission under control, a series of stricter measures were announced first at regional and then at national level(14); social gatherings were ceased, as did stores, restaurants and religious sites. On 23/03/2020, with 695 total confirmed cases and 17 COVID-attributed deaths(15), strict regulations in the movement of citizens were announced(14).

However, during this crucial time, as well as the period until early May, when total COVID cases reached the 2500 milestone(16), understaffed PHC units and the lack of technical, protective and logistical equipment limited healthcare services and impeded healthcare professionals, who raced in the frontline against an invisible enemy. Unfortunately, our literature review cannot strongly and vividly support the aforementioned situation, as evidence regarding organizational and operational aspects of the Greek National Health System(NHS), the problems as well as the solutions proposed by PHC Units during the pandemic are limited.

In the spectrum of social distancing measures, all on-site educational activities in school and university units across the country were ceased, with classes and lectures continuing shortly after with distance learning methods and tools(14,17). As soon as the lockdown measures were eased (04/05/2020), Greek Medical Schools jointly decided on the gradual return of students for clinical practice, which could fundamentally not be replaced by distance learning. Taking this joint decision into consideration, the Medical School of AUTH decided the continuation of in-person clinical practice of senior students in PHC and General Practice in Rural Practices across the country for a period of 2 weeks.

At the end of their on-site practice in PHC Units, senior students were asked to interview a healthcare worker of their Unit, regarding the management and experiences of the COVID-19 pandemic, and present their findings and conclusions in a final report. Consequently, the purpose of this study is to showcase the efforts of AUTH senior medical students in gathering and highlighting the thoughts and concerns of PHC healthcare professionals. Our goal is to draw useful conclusions regarding the operation of PHC Units during the pandemic, NHS's readiness for a possible second wave, by analyzing and evaluating the healthcare workers' interviews. Ultimately, through the personal opinion and thoughts of students, we are striving to illustrate the views of this new generation of healthcare workers in the issue of medical education in PHC Units in the midst of pandemics, as well as their thoughts on the reaction and adapted functioning of PHC Units in this challenging emergency crisis.



Material and Methodology

The Study Programme of the School of Medicine of the Aristotle University of Thessaloniki mandates a 4 week clinical practice in PHC Units. Senior students can opt from a list of collaborating Units, which includes Health Centers and Rural Practices, across the country. During their clinical practice, students interact with their respective tutors, who are responsible for their theoretical and practical training. In this way senior students come into real contact with PHC Units and their healthcare professionals.

In the era of SARS-CoV-2, as was mentioned above, in-person clinical practice took place for a period of 2 weeks (25/05/2020-05/06/2020), whilst the period before commencing the practice a series of online lectures preceded (11/05/2020-22/05/2020). These aimed at theoretically preparing students before their practice in a COVID-transformed environment as well as raising awareness and igniting discussions over the practical issues that may arise in the everyday life of a PHC Unit. At the end of their practice, senior students were asked to interview a healthcare professional from their Unit, regarding the management of the pandemic, and present their findings in a final report. The student reports, which included transcriptions, were collected and systematically analyzed by the working group.

This report, containing qualitative data, was compiled after the review of final papers and interviews. The working group would like to once again highlight the fact that an interview guide with mostly open as well as closed-ended questions was compiled and entrusted to students to guide their interview with healthcare professionals.

Themes explored through the working groups analysis are;

- The availability of Personal Protective Equipment at the outbreak and during the pandemic
- The presence of a separated area for examination of suspected cases
- The management of suspected cases
- The management of chronic conditions and the operation of outpatient and rural departments
- The use of telemedicine (phone appointments, video calls, intangible e-prescriptions)
- The home visits
- Readiness in a possible second wave regarding personnel (total number and broad speciality capacity)
- The role of students in a pandemic

Table 1: Outline of the semi-structured interview

1. Supposing a patient with suspected symptoms visits the PHC Unit. Would you like to tell me which procedure is followed at this moment?

- 1.1. Is there a separated area for the examination of suspected cases? Does it have the appropriate equipment? Do you have the appropriate equipment?
- 1.2. If referral is needed, how is the patient transported? Is he using his own means, an ambulance, public transport, taxi or bus?

2. Supposing a patient with possible COVID-19 infection and mild symptoms remains home. Would you like to tell me which procedure was followed during March-April?

- 2.1. What happens with those patients?
- 2.2. Do they contact you?
- 2.3. Do you contact them?
- 2.4. Is there a follow-up system?

3. Supposing a patient with an acute problem yet without COVID-suspected symptoms visits the PHC Unit. Would you like to tell me which procedure is followed at this moment?

- 3.1. Was there a difference in visitation-management of non-COVID patients during March and April, when austere measures were in place?

4. Regarding the personnel of this PHC Unit

- 4.1. Is there adequacy of personnel (number/specialties) in this Unit?
- 4.2. Were there transfers of Doctors in Hospitals? How do you evaluate this decision?
- 4.3. Which were the consequences of the transfers on the operation of the PHC Unit?
- 4.4. Were there shortages due to special purpose leaves?
- 4.5. Did any of the personnel get infected? What happened in this case?

5. Regarding chronic conditions

- 5.1. Does the PHC Units have an appointment system? What happened with these during March-April?
- 5.2. Were outpatient departments working in the PHC Unit during the same period? In which way? What happens now?
- 5.3. What happened with the follow-up of patients with chronic conditions during March and April? What is happening now?
- 5.4. What happened to Rural Practices at the same period? Did they close? How were patients serviced? What is happening now?
- 5.5. What happened to repeat prescription during March and April? Did you use non-printed e-prescriptions? What is your opinion on this?
- 5.6. Were there thoughts on using technological advancements (e.g. video calls)? What is your opinion?
- 5.7. Did you make phone appointments? Which are your thoughts/concerns over those?

6. Home visits

- 6.1. Supposing someone calls mentioning an elderly man, who cannot move at home, with a fever of 39°C. Would you like to tell me which procedure was followed during March-April at the PHC Unit?
- 6.2. Supposing someone calls mentioning an elderly woman, who cannot move, with severe abdominal pain. Would you like to tell me which procedure was followed during March-April at the PHC Unit?
- 6.3. Were home visits happening before the pandemic?
- 6.4. If so, was there a change in the pandemic?
- 6.5. Regarding home visits, is there something that concerns you in light of the new circumstances?

7.Regarding the preparedness of PHC Units before the pandemic as well as during its outbreak

- 7.1. Did you have any training or information on following hygiene and safety measures in the event of a possible pandemic?
- 7.2. Was there adequacy of Personal Protective Equipment including masks, suits, gloves, alcohol solutions from the beginning?
- 7.3. If inadequacies were present, how were they tackled?
- 7.4. Were there donations? What do you think of those?

8.Regarding the difficult period that is behind us (March - April), describe an incident which was memorable and tell us the reasons why you opted for this incident.

9.Regarding a possible second wave of the COVID-19 pandemic this fall

- 9.1. How prepared is the National Health System for it?
- 9.2. How prepared do you feel?
- 9.3. Is there adequacy in terms of personnel?
- 9.4. Do you have sufficient Personal Protective Equipment?
- 9.5. What more would you like to feel better prepared?

10.Ultimately, we would like to ask you which is the role of medical students in similar situations?

- 10.1. Should their practice be stopped or should they participate in the services provided by the PHC Unit?
- 10.2. Under which circumstances could they help?
- 10.3. How could they help? Provide us with some examples?

11.Would you like to add something else?

Students invited healthcare professionals in PHC Units to participate in the study. Interviews were conducted with healthcare professionals who agreed upon and gave their consent. Interviews were anonymous and were conducted with either voice recording and transcription or with the use of notes. These tools were then used by senior students to compile and submit their report.

The analysis of interviews by the working group took place in 5 steps. In early stages demographic characteristics, including PHC Units as well as the role of the interviewee in the health team of the respective Unit, were registered. Every interview was given a unique number, important for the continuation of our analysis.

Quantitative analysis took place shortly after. Each member of the working group was responsible for going through approximately 15 interviews and proposed their main themes to the group. In a series of group meetings outlining interview thematics and clustering, a consensus was reached over the themes raised in source materials.

Results

In total, 50 different PHC Units (Health Centers and Rural Practices) and 83 healthcare professionals participated in the study. The demographic representation of our study is outlined in the following Table.

Table 2: Demographic characteristics of participating PHC Units and Professionals

Number of PHC Units per Health Care Region	PHC Unit and Number	Percentage %
1st Health Care Region (Attiki)	4 Health Centers (HC)	8%
2nd Health Care Region (Piraeus and Aegean)	2 HC	4%
3rd Health Care Region (Macedonia)	14 HC and 3 Local Health Units (LHU)	34%
4th Health Care Region (Macedonia, Thrace)	16 HC and 3 LHU	38%
5th Health Care Region (Thessaly, Sterea Ellada)	5 HC	10%
6th Health Care Region (Peloponnese, Ionian Islands, Epirus and Western Greece)	3 HC	6%
Total	50 PHC Units (44 HC & 6 LHU)	100%

Speciality	Number of Interviewees	Percentage %
General Practitioners	54	65,1%
Nurses	10	12,1%
Rural General Practitioners	6	7,2%
Doctors of Internal Medicine	4	4,8%
Pediatricians	4	4,8%
General Practitioners (Residents)	3	3,6%
Midwives	2	2,4%
Total	83 participants	100%

The qualitative analysis of interviews highlighted 4 main areas of interest;

1. Preparedness of PHC Units in combating the pandemic
2. Operational aspects of PHC Units
 - a. Chronic Conditions
 - b. Emergency cases – Acute cases (suspected cases and all other cases)
3. Readiness of PHC Units towards a possible second wave
4. Role of medical students

1.Preparedness of PHC Units in combating the pandemic

According to the responses of healthcare professionals, separated areas for examination and management of suspected cases were present in the vast majority of PHC Units. To make room for such areas, PHC units utilized pre-existing spaces, where possible, and in some cases Units assembled spaces to be used solely for COVID-related issues; triage, examination of patients with respiratory symptoms (fever, cough, shortness of breath), initial management and referencing suspected cases to secondary/tertiary care if needed. Adequate PPE, presence of distinct and separate entrance and exit as well as ventilation before and after examining each patient, are the core characteristics of such spaces in PHC Units.

"With appropriate equipment, uniforms, masks and sufficient ventilation, these areas are deemed as second Emergency Department rooms. What is more, the quality of materials used to make these spaces enable better and frequent decontamination"
(51, General Practitioner)

As far as Personal Protective Equipment is concerned, major shortages seemed to be the norm in the early stages of the pandemic. As the health crisis progressed, the situation gradually improved, in most cases due to the involvement and active participation of citizens and private initiatives in the form of donations. Yet, this lack of PPE was not a universal problem, with discrepancies being present among PHC Units; some Units report adequacy from the early stages of the pandemic, whilst in others the scarcity of equipment called for solutions born of desperation even until the end stages of the first wave of the pandemic.

"At least when it comes to masks, these were scarce. We had a big lack of masks, we were made to use the same masks for two and three days in a row"
(19, Rural General Practitioner)

During the pandemic, Primary Health Care weakened as a result of transferring Medical Doctors and Nurses in secondary and tertiary hospitals. Understaffed PHC Units overburdened remaining healthcare professionals and struggled in delivering their everyday services. In addition to being the main reason behind understaffing of PHC Units, personnel transfers were frequent and deemed relatively pointless by interviewees, as transferred professionals were not ready to effectively meet the needs of their new placements.

Healthcare professionals contracting COVID-19 was a relatively scarce finding, which made for a pleasant surprise. However, special purpose leaves were awarded to certain healthcare professionals, overburdening the remaining staff of a Unit, who had to cover for ever-increasing needs. Special purpose leaves were reserved for personnel that had to stay at home and take care of children, as school units ceased operations. In Units with significant understaffing issues, professionals eligible for such special purpose leaves, accepted to work in positions that do not entail coming into contact with suspected cases. It needs to be highlighted, that in some cases and regarding specific specialities, PHC Units across the country were facing shortages even before the outbreak of the pandemic. Made even more evident in light of the emergency health crisis, these were still not addressed by the respective authorities.

"Transfers... a lot of them were pointless because of the absence of epidemiological burden in the area. They weakened PHC and the reduced functionality caused an outburst in the local community and had a transfer revoked" (66, General Practitioner)

"Special purpose transfers were worsening functionality" (22, Nurse)

"A member of the healthcare group happened to become ill (with mild fever, sore throat and pain). We contacted the Regional Authorities and followed their instructions. This patient went to the Emergency Department of the hospital, where a COVID test was performed. Refrained from work until the test results, we had him/her back at the Unit when these came out negative."(44, Pediatrician)

Regarding information flow and training of PHC personnel, the working group came across some interesting findings. Actions taken by respective authorities were considered insufficient in many cases (e.g. use of mailing lists for distributing guidelines) and the main source of information and updates was simply the website of the National Public Health Organisation. In limited cases, one delegate from a PHC Unit attended workshops on the use and management of PPE in the reference Hospital and was then called to share knowledge with the health team of his Unit. As a result, PHC personnel had to manage the crisis, often without having most recent guidelines at their disposal, or follow outdated protocols without the appropriate training. Confusion and uncertainty was the norm and it turned out that each healthcare professional was solely responsible for his own training and education on the novel virus. However, in a handful of Units, medical doctors, specialized in the field of pandemics, after getting trained, took over the task of training their colleagues. Actions such as the above maximized productivity output and relieved personnel's insecurities.

"Guidelines from previous pandemics, such as the SARS one, were present and so did PPE and appropriate training in our Unit. Simulations, revisions of application procedure of PPE were taking place to make sure personnel are ready. Then specific guidelines and additional equipment were made available"(50, General Practitioner)

"As healthcare professionals, we are theoretically trained. During the pandemic additional training took place, which were attended by one person from every Unit, something like a delegate. This delegate had to then share knowledge with the rest of the healthcare professionals of the Unit, something that I don't consider as proper education and training."(65, General Practitioner)


2.Operational aspects of PHC Units

In this section, we are initially focusing on the function of outpatient departments (appointments of chronically ill patients and non-emergency patients) and Rural Practices.

Management and follow-up of chronic illness was feasible in the majority of cases through phone calls, as outpatient departments ceased operations. It is worth mentioning that according to interviewees, no emphasis in the management of chronically ill patients was given, unless such conditions deteriorated and further investigation was necessary. More specifically, in the majority of PHC Units, outpatient appointments, solely for repeat prescription purposes, were gradually reduced and discontinued during the lockdown phase of the Hellenic Republic. The recently developed tool of intangible e-prescriptions, which are sent via email or text message to patients who then proceeded to drug stores, was not widely used. Patients with chronic illness as well as long-followed individuals with known medical history were offered telephone guidance by healthcare professionals who expressed reservations for any potential medical errors. For such errors to be avoided, frequent phone contact was deployed, substituting physical presence in the outpatient departments.

"If something is not notably urgent and could be dealt with at a later time without deteriorating patient's health, then guidelines mandated its later management for the patient's own safety" (69, Rural General Practitioner)

Rural Practices operated accordingly. Most of them remained closed, following the decisions of the respective Health Authority and patients were referred to the outpatient departments of the respective Health Centers. Rural Practices, which continued operations, made careful and strict use of PPE. Patient visitation in Units dropped significantly and only serious cases were examined in-person.

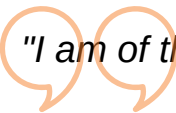


"Regarding Rural Practices, these continued to operate only in referral villages and strict attendance measures were put in place. The 'Help at Home' programme was deployed and Units adapted daily and weekly programming schedules, with less working hours, serving a smaller number of patients and strictly following all protective measures."(51, General Practitioner)

Intangible repeat e-prescriptions

Since the outbreak of the COVID-19 pandemic in Greece, the concept of intangible e-prescriptions was developed for use in chronic and acute cases. Patients agree to the service's terms and conditions and activate the service through a special application. With the use of such prescriptions, physical presence in PHC Units is not required; healthcare professionals can digitally sign repeat prescriptions and patients, contrary to conventional printed versions, receive a special barcode with their prescription in their email or phone via SMS. Patients can then proceed to their preferred drug store, where the barcode is scanned and drugs are distributed.

At first patients seemed eager to take on this novel format, yet problems surfaced amongst the elderly who were not acquainted with technological advancements. The majority of doctors in our survey does not hold a positive stance towards intangible repeat e-prescriptions; it cannot substitute the functional model of physical presence and communication doctors have with patients when issuing a conventional, printed repeat e-prescription.



"I am of the opinion that we should be cautious not to substitute contact with patients, as repeat prescription is also a reason of patient consultation and examination"(73, General Practitioner)

Home visits

The issue of home visits turned out to be a rather interesting one, since most healthcare professionals highlighted that these were not carried out both before and after the outbreak of the pandemic. Those professionals who were visiting patients at homes prior to the crisis, continued to do so even during the pandemic. In this case, home visits were few and far between and were reserved for serious cases as well as immobilized patients. Therefore, home visits were limited, and their criteria became stricter. Doctors were visiting patients with special suits and using all protective measures, as the fear of an unknown patient environment was imminent; one could never know if patients or relatives suffer from related symptoms, are asymptomatic carriers or even have a history of recent travel.

"Whilst we should normally perform home visits, there are no respective guidelines in place. We have requested the regional health authorities to define a framework for home visit calls and appropriate responses"(30, General Practitioner)

"Suspected cases that require a home visit cannot be serviced at home. Even for non-suspected cases things are not that simple as a thorough investigation happens before visiting them at home"(50, General Practitioner)

Phone contact – Video calls – Telemedicine

During the pandemic, concerns were raised over the use of telemedicine tools, with regards to phone appointments as well as video calls. A major drop in visitation and attendance in PHC Units, according to guidelines from the National Public Health Organisation, paved the way for utilizing technological advancements. Phone contact with patients, though described as telephone appointment, in the majority of cases refers to unstructured patient-doctor communication, taking place in no certain timeline, without a centralized system, with the exception of a few Units where a systematic registry was in place.


"Right now, as phone consultations are so frequent, a book was used to register phone contacts as well as guidelines given to patients by doctors"(50, General Practitioner)

"You couldn't exactly label them as phone appointments. They were simply calling for everything worrying and guidance was given"(45, Rural General Practitioner)

Diagnosis was the main reason for phone consultations, where appropriate guidelines for home management of cases and, in acute conditions, fast referral to PHC Units were given. However, a considerable amount of the general population utilized phone contact for repeat prescription and management of chronic cases. While telemedicine provided solutions to patient needs during the pandemic, it is clear that at this stage telemedicine conditions are not mature enough to successfully substitute conventional clinical practices.


"A lot of phone appointments and repeat prescription took place over the phone but even the outpatient department in this early phase {after the ease of lockdown} is still conducted via phone consultations with some patients"(33, General Practitioner)

Regarding video calls, an inconsiderably small amount of interviewees tried to utilize them, as patients were not familiar. It was pointed out that such tools are useful for rather young demographics. Yet, healthcare professionals do voice their concerns over the use of video calls and despite their positive attitude, they were met with limited use.



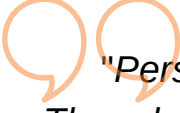
"Both intangible e-prescriptions as well as technological advancements (e.g. video calls) cannot be easily applied to elderly patients, who are not familiar with such uses of technology. Moreover, telemedicine can cause a plethora of errors and make professionals underdiagnose critical conditions"(46, General Practitioner)

Factors disheartening medical professionals to take up telemedicine tools include the lack of adequate time, scarcity of appropriate technological and logistical equipment as well as a structured web application.



*"We haven't used video calls yet as our computers could not support them"
(33 General Practitioner)*

However, it was pointed out that in comparison to traditional phone calls, video calls provide real-time images of patients, thus enhancing the quality of the differential diagnosis. There could be a potential for wider use, provided that a common framework and software environment is developed.



*"Personally I am in favor of conditionally utilizing new technologies in healthcare. There has to be a common support system-platform for such digital tools at the doctors disposal, as well as regulation of compensation for its use. Proper training of both doctors and citizens to ensure digital literacy has to be achieved"
(31, General Practitioner)*

2a. Management of chronically ill patients

It was widely reported that the follow-up of patients with chronic conditions was not prioritized during the pandemic. In-person attendance in PHC Units dropped dramatically, as the COVID-19 threat was looming. Before entering the Units, temperature and other vital signs (blood pressure, oxygen saturation, heart rate) were checked and depending on the occasion, the doctor decided whether patients could enter indoors or not. Healthcare professionals focused on repeat prescriptions for chronically ill patients and phone contact for consultation and general information.

"At first, we have a temperature check. If the patient doesn't have fever and related symptoms, examination was performed within the Health Center. We were monitoring and managing the condition. If he had fever, cough or dyspnoea, examination was performed in a customized space outside the Health Center"

(75, General Practitioner)

The conventional method of electronic repeat prescription was widely used. Patients, via phone calls or physical presence, informed doctors about the need for prescription and doctors filled out and printed prescriptions. Nurses then collected and handed out prescriptions through a special window in the Unit. Extensive care was given, and nurses agreed upon with patients on a specific time for prescription take-away, so as to avoid congestion. Repeat Prescriptions were also distributed via the "Help at Home" programme which is run by many Municipalities of the Hellenic Republic.

"Repeat prescription for chronically ill patients was feasible at that moment after phone contact either with our established partnership with 'Help at Home' programme of Municipalities or with intangible e-prescriptions"(31, General Practitioner)

2b. Management of emergency cases (suspected and non suspected cases)

In cases where PHC Units had to manage patients with possible COVID-19 infection, two management categories emerged from the source material of our study.

2b.1 Management of suspected cases via phone consultation

Patients with COVID-19 typical symptoms, who opted for phone communication with PHC Units for guidelines, fall under the first management category.

"Patients were calling us from home, informing us that they have fever, they feel good and have no dyspnoea... we told them to count, we taught them to even count their breaths. All of their personal details were kept in the special registry we created"(28, Nurse)

In patients with possible COVID-19 infection, after taking their medical history, stay-at-home and monitoring guidelines were given for those with mild symptoms. Yet, conflicts within health teams ignited when managing cases with severely progressed symptoms.

"From 30th March onward, all suspected cases are managed via phone calls, without physical examination... if symptoms are getting worse, patients are referred to the Hospital" (23, General Practitioner)

The Ministry of Health failed to provide a centralized system for the follow-up of patients with suspected symptoms, hence the discrepancies outlined in the analysis.

"We did not have a specific follow-up system... each doctor was following what he thought was optimal"(33, General Practitioner)

During the pandemic, it is clear that a lot of PHC Units were offering an organized follow-up plan regarding phone contact with patients. Health teams took the initiative to contact suspected stay-at-home patients every 2-3 days, collected information about current developments in their condition and filled their details in Unit-made registries. Other Units informed patients that they should take initiative to update the Unit on their condition. Regardless of their system, all Units had a common approach in emphasizing patients the utmost importance of notifying the Unit in case their clinical condition deteriorates.

"More specifically, during March (containment phase) the Health Center was functioning according to guidelines and definitions laid out by the National Public Health Organisation. Patients and medical personnel took the initiative for mutual contact. During April (delay phase) we followed the instructions based on an algorithm developed by a doctor of the Health Center..., allowing for better follow-up as well as systematic registry of clinical manifestation and course of patients. The same system applies today and personnel seeks contact every 2-3 days"(51, general Practitioner)

A highly interesting finding is the presence of a separated registry for the details of suspected cases, so that a more systematic approach towards follow-up could be achieved.

"Phone contacts are present and registered in a separate book. Everything we say through the phone are written down and according to the course of illness appropriate guidelines should be given"(19, Rural General Practitioner)

2b.2 Management of suspected cases who visit PHC Unit

In the case of patients with suspected symptoms who visit the PHC Unit, a different response is generated in the triage area according to his anamnesis. Patients might need to be examined with all the necessary PPE in a separate area, using the same or a different entrance than the rest of the Unit. In some cases, patients might not be examined at the Unit and are referred directly to secondary and tertiary care for testing purposes. Ultimately, another form of managing suspected patients with mild symptoms was communicating with the respective doctor and returning for stay-at-home follow-up, without entrance and examination in the Unit's premises.

"If a patient had travel history, it is considered a suspected case, according to the guidelines of the National Public Health Organisation. Having in mind whether he/she falls under the vulnerable group category, we examine the patient in a specially designed area or we discharge them with guidelines for stay-at-home management.

Regular phone contact with the doctor responsible for this patient is present"

(19, Rural General Practitioner)

"When a patient with severe symptoms visited our Unit, the doctors on duty would call the National Public Health Organisation. The doctor was guided and given further instructions when referral to tertiary hospital/reference center via ambulance was needed. In the Health Center, no suspected cases remained and no tests for the virus were performed"(47, General Practitioner)

2b.3 Referral of COVID-19 suspected cases

Referral of suspected cases, when needed, took place with the use of private cars and ambulances with or without an accompanied doctor. The patient's clinical condition mandated whether referral was necessary or not.

"In case a patient needs to be referred to the hospital, as long as he is a good general condition, he transfers using his own vehicle. If a vehicle is not available and/or in serious conditions, referral is provided by an ambulance. Under no circumstances is the use of public transport or taxi allowed"(51, General Practitioner)

"According to guidelines by the National Public Health Organisation, a special ambulance has to be deployed to pick up and transfer patients to referral hospitals"

(35, General Practitioner)

2b.4 Management of non-COVID-19 cases in emergency department

Before the entrance of non-COVID emergency cases within the premises of the Unit, temperature and oxygen saturation checks were performed and only then, entrance in the emergency department was allowed. Personnel strived for meticulous precautions when contacting patients and use of PPE was indisputable.

"Temperature and oxygen saturation checks are performed like in any other patient entering the Health Center. He is then referred to the emergency department and examined by on duty doctors"(18, Pediatrician)

3. Readiness towards a possible second wave of the COVID-19 pandemic

As far as readiness for a possible second wave is concerned, the working group noticed a variation in responses, according to personal stances of interviewees as well as the demographic characteristics, capabilities and needs of each PHC unit. In general, better structure, insight, experience, training and subsequently readiness is reported. In light of the new wave, it seems that an initial sufficiency of PPE and personnel will be evident. Yet, healthcare professionals underlined the need for targeted governmental support schemes, as during the initial outbreak of the pandemic PHC Units were weakened. PHC Units should be self-sufficient in terms of equipment and shall neither rely on donations, nor overburden existing personnel with overtime service to cover for understaffed positions.

"It (National Health System) is definitely more ready than the first time. There are concerns though over the lack of PPE and the constant burden of medical and nursing staff with overtime work. The systematic check for the novel virus in all PHC Unit's personnel is a substantial omission from the action plan of first wave, which need to be taken care of in light of the second one in the fall"(66, General Practitioner)

4. Role of medical students in a pandemic

During the pandemic, clinical practice was ceased, with voices against this decision being raised in unofficial grounds. This was also reflected in the interviews of healthcare professionals.

More specifically, the majority of interviewees agree that in-person educational activities should continue, especially for senior medical students who will soon enough be called in the frontline. In this way, students will gain valuable experience in managing such cases and relieve the burden from the shoulders of the existing personnel in PHC Units. However, this does require that PPE is available and abundant and limitations in their responsibilities are to be set. They shall perform simple clinical actions such as pulse oximetry, blood pressure measurement, clinical examination of non suspected cases as well as aid in practical issues with the notable example of repeat prescriptions.

"Taking part in population awareness campaigns, providing personnel with academic knowledge, systematic follow-up of changes in guidelines issued by the National Public Health Organisation, safeguarding personal hygiene rules as well as aiding in follow-up hotlines are just a few of the ways students can contribute"(51, General Practitioner)

On the other hand, discontinuation of clinical practice was also supported. Many argued that there is no need to expose students to unnecessary danger. We are combating an unknown disease and PPE is not adequate. Also, the course of the pandemic in our country was slow and the National Health System responded satisfactory. Students should be called to help only in extreme cases and as a last resort, as our interviewees pointed out.



"If personnel is at hand, there is no need for students. In remote areas, and when personnel aren't sufficient, students could be deployed to help. They have to be trained though."(20, Doctor of Internal Medicine)

Discussion

The recent COVID-19 pandemic posed a challenge to National Health Systems around the globe. The role of Primary Health Care is universally acknowledged. This study set out to map the readiness of PHC Units across the country for health emergencies like the COVID-19 pandemic. Health Administration's reflexes towards immediate staff training, preparedness for management of suspected cases as well as the uninterrupted healthcare service provision for chronically ill patients (both in Units' premises and at homes) are few of the themes explored. This study has also highlighted the important role medical students have in all stages of a pandemic.

PHC in a pandemic

COVID-19 was soon to be named as a "great unleveler"; its gloomy aftermaths will disproportionately affect vulnerable social groups. Primary Health Care, the first contact of patients in the Health Systems, has to be supported so as to tackle challenges that COVID-19 surfaced(18). Regarding preparedness of Units, this study has showcased that while separate areas for examination of COVID-19 suspected cases were in place, adequate Personal Protective Equipment was not always the case.

These scarcities were partially overcome through private donations of appropriate equipment. The already understaffed PHC Units suffered from personnel transfers to referral hospitals as well as special purpose leaves. Non-infection of PHC personnel during the first wave of the pandemic is a positive note. What is more, it is underlined that PHC is still not a unified entity and should thus be tailored to the needs of the service area. Ultimately, when it comes to preparedness, a major setback in the process was the lack of systematic, structured training for PHC personnel. More often than not, training and knowledge sharing was based on healthcare professionals' own initiatives, who had to scholarly go through, evaluate and make daily use of inundated information and guidelines from the National Public Health Organisation(19).

Function of PHC Units in the pandemic

Supported in limiting viral transmission by literature, Primary Health Care focused on applying the social distancing model and patient care was gradually taking a digital format(19). A handful of milestones in strengthening PHC, reached before the pandemic, became eventually not applicable. Starting from outpatient departments, these were at first discontinued indefinitely according to National Public Health Organisation's instructions, and chronic illness was managed via phone consultations. Despite being a core PHC value, no frequent communication of personnel with the Unit's population was feasible(20). Personnel from Rural Practices could offer additional support in Health Centers, according to the action plan, but this was not implemented in reality. Transfer of professionals from PHC to referral hospitals weakened the role of PHC, was considered pointless and was of little or no help to the Health System. No home visits from PHC personnel for the management of chronic illness was feasible. This little to none home visitation service, happening only when it is extremely necessary, is in contrast with the role and values of PHC. The relatively low number of home visits was driven to all-time lows in the midst of the pandemic, as fear of COVID-19 infection and lack of PPE were the norm.

Use of telemedicine

This emergency health crisis initiated a shift in patient-doctor communication methods for the management of both chronic and acute illness. Telemedicine thrived in a social distancing environment and phone consultation aided in reducing congestion in PHC Units, as mandated by the National Public Health Organisation(20-22).

Despite the use of real-time images and their diagnostic indications(18), the full potential of video calls was not realized as elderly population, the main recipient of PHC, was not acquainted with such advancements. As literature depicts, a rigid telemedicine platform eases the burden of healthcare systems, preventing an overwhelming amount of patients from flocking into emergency departments. This platform though requires structure, distribution and time, all of which were not at disposal in the pandemic(22-23).

Intangible repeat e-prescriptions faced similar problems, as the proposed system also posed difficulties for the elderly population. Yet, as our study suggests, its limited use cannot be entirely attributed to patients' behavior and stance. Lots of healthcare professionals regard intangible e-prescriptions as a means of indirect contact between patients and professionals. This misconception could be attributed to the time the Ministry of Health introduced the new way of prescription but also to its presentation as a system that supports the avoid of unnecessary contact with the elderly.

Objections and reservations of our country's healthcare professionals regarding telemedicine contradict the findings research targeting Lebanese healthcare professionals(23).

Management of chronic illness in PHC during the pandemic

Due to a significant drop in PHC Units' visitation, management of chronically ill patients was limited to repeat prescription, as few stopped by the Units(24). As literature suggests, Health Systems should propose a way of managing chronic illness in PHC, when physical presence in the respective Units is not feasible(21) . Due to the limited use of intangible e-prescriptions, repeat prescription was performed using conventional methods. Doctors were informed of the need for prescription via phone consultations or via physical presence of patients outside the premises of PHC Units. After prescriptions were printed and signed, distribution methods through a window of the Unit, individual pharmacists or the "Help at Home" programme were deployed. The outbreak of COVID-19 let management of chronic illness fall behind and its consequences are to be seen long after the battle with the novel virus is won(25).

Management of emergency cases in PHC during the pandemic

Emergency departments never ceased operations. All incoming patients were triaged and divided into two distinct categories, COVID and non-COVID cases. Patients with mild symptoms were advised to contact the National Public Health Organisation and get phone consultation as long as their symptoms remained similar. Yet, most patients, regardless of the severity of symptoms, visited PHC Units. Patients with mild symptoms returned with stay-at-home instructions. In most PHC Units, no structured follow-up system of such patients was in place.

In PHC Units with PPE shortages, suspected patients were not examined but were rather referred directly to hospital units. The abundance of PPE is necessary for Primary Health Care to be able to fulfil its role; nevertheless, in the effort to meet the growing needs, the rational use of the available equipment seems as important as the production and distribution of new protective material(28-31). A structured stay-at-home follow-up system of suspected cases , where feasible, is detrimental for offering optimal care and prompt response, in case symptoms deteriorate(32).

Reduced possibility of viral transmission is ensured, when using ambulances to transport suspected cases to hospitals, provided that appropriate protective equipment is available(32). On the other hand, the risk of overusing such services is imminent and ambulances might not be available for other emergency situations. It is widely acknowledged that patient visitation in the emergency departments fell sharply during the pandemic. This situation was pointed out in similar studies in literature as well(33-34). One can assume that this derives from patients' fear of contracting the virus, when visiting emergency departments for other reasons.

Readiness for a possible second wave of COVID-19

According to our responses, insight, experience, better training, academic knowledge and efficient structure are evident and key to combating the second wave. These findings are consistent with recommendations and key points of action plans that need to be in place, in order to combat a second wave of the virus, which might emerge in fall(35). As far as PPE and personnel scarcities are concerned, participants in our survey highlighted the existing inadequacies and reiterated the need for generous state aid so as to secure abundances in the second wave. However, according to literature, a lot more steps need to be taken to properly prepare for the next wave(35-38).

Role of medical students during a pandemic

In this COVID-19 pandemic, the disruption of medical training was inevitable. Although medical educators have been forced to immediately consolidate distance learning environments, students' clinical exposure remains an indispensable part of medical education(39-41). The probable negative impact of students on coronavirus transmission rates within hospitals, shortages of Personal Protective Equipment (PPE), lack of proper training and experience, as well as the given limited students' ability to work independently without supervision, arise reasonable concerns regarding their involvement in COVID-19 pandemic management(42-44).

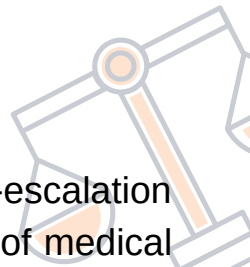
Nevertheless, coronavirus easy transmission and heavy workload caused by the exponentially increasing number of new cases, could soon provoke severe deficiencies of the frontline medical workforce(42,45-49). Hence, the probability of covering significant gaps in human resources by effectively deploying students should not be rejected in advance; students can contribute, as far as they serve within their competence level, based on their education and experience, and as far as proper and continuous supervision is prioritized to ensure the safety of both themselves and patients(50-52). Besides, many of the healthcare providers who participated in this study expressed the view that a pandemic poses a valuable learning opportunity for education in health crisis management, which could lead to enhanced preparedness for future outbreaks.

Students' commitment to contribute is remarkable across the globe, with many of them, to be willing to offer their service(41,46,53,54). In PHC settings, one possibility for students could be to provide care in patients treated for no COVID19-related diseases, by taking histories, participating in common daily procedures, documenting visits, and fielding questions about COVID-19(55). Another possibility is to help patient temperature screening or take swabs and implement rapid testing that informs community surveillance(56).

In general, it seems that especially senior medical students are experienced enough to effectively receive many of the responsibilities of a General Practitioner (GP) in the community(11). In Cuba, a promising prevention plan based on active screening has been implemented to interrupt the transmission chain; senior medical students, well-educated in Primary Care and epidemiology principles, moved literally from door-to-door to increase community surveillance and enhance case detection(10). A wider role that medical students can play is related to public health awareness initiatives by offering guidance and challenging false news or misconceptions, as already happened in the US and Brazil(12,57,58).

Strengths and limitations of the study

This is the first-of-its-kind study in our country that took place in the de-escalation measures of the Hellenic Republic. This study was performed with the help of medical students from the School of Medicine of the Aristotle University of Thessaloniki, who had limited experience in conducting interviews. The choice of both Primary Health Care Units and healthcare professionals that took part in our study, was not made with systematic methodology to achieve stratification and representativeness but with convenience sampling. Yet, the big amount of interviews (83 participants) in 50 different PHC Units is one of the strongest points of the study, communicating our findings' extraordinary significance.



Conclusions

Primary Health Care in our country responded rapidly in its new role, which emerged in the outbreak of the COVID-19 pandemic. A series of best practices for the management of emergency cases in PHC Units were depicted in our study, foretelling greater readiness towards an upcoming crisis period. Training of healthcare professionals on managing COVID-19 suspected cases, triage methods at the entrance of Units, deployment of separated areas with individual entrance and exit points for clinical examination of suspected cases as well as adequacy and proper use of PPE are some of the most notable examples.

At the same time, a series of important steps were underlined so as to cover healthcare needs of a Units' respective population of responsibility. Emphasis was given in the systematic follow-up of COVID-19 patients at home, with efficient communication and registry systems, as well as management of chronically ill patients, who should remain home, when social distancing in light of a pandemic is required. The role of AUTH medical students is pivotal and in our case contributed to mapping out the current situation. Useful conclusions were drawn and areas of improvement are highlighted so that Primary Health Care can better respond to health emergencies in the future.



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