Special Article

The Development of a Post COVID-19 Clinic at the University General Hospital of Ioannina in Greece

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Abstract

In recent years, the global world is facing the COVID-19 pandemic, which has caused significant long-term consequences to the population's health. Post COVID-19 is considered an implication of the various that has drawn the attention of the scientific world, as the reported cases are increasing rapidly globally and the danger of permanent disorder is real. This article focuses on the significance of specialized clinics for post COVID-19 cases and on their working methods. Hence, the example of the establishment of a specialized clinic in the University General Hospital of Ioannina (U.G.H.I.) is provided, based on a SWOT analysis, while at the same time a realistic approach to its development is presented. The proper therapeutic approach of the people that suffer from the post COVID-19 will contribute to the protection and well-being of the society, dealing effectively, in this way, with the problems caused by the of the ongoing SARS-CoV2 pandemic.

Keywords: post COVID-19, long COVID-19, post COVID-19 clinics, health services planning, SWOT analysis

Introduction

Over the past years, the global community struggles with the COVID-19 pandemic, which is an infection of the respiratory system caused by the SARS-CoV2 virus. Since December 2019, when the virus appeared, until today, more than 550 million people have been infected and almost 6,3 million deaths have occurred worldwide (WHO, 2022). In particular, in Greece, 3,8 million confirmed incidents of COVID-19 and 30.400 deaths have been reported (HNPHO, 2022). Most patients fully recover from COVID-19 within 3 weeks, but a significant portion of COVID-19 patients continue to have long-term manifestations from the respiratory system or from other systems. This condition has been called long COVID-19 or post COVID-19. The post COVID-19 condition, as proposed by World Health Organization, is defined as a syndrome that concerns people with a history of possible or confirmed infection with the SARS-CoV2 virus and the symptoms usually emerge within 3 months by the first infection. These symptoms last for at least 2 months and no other clinical condition can explain them (WHO, 2021).

The purpose of this article is to analyze the impact that post COVID-19 has on both the individual and the society as a whole and, thus, to emphasize the need to develop specialized post COVID-19 clinics. For these reasons, an example of developing a post COVID-19 clinic in University General Hospital of Ioannina will be presented through a SWOT analysis and its creation will be completed based on the principles of planning.

Consequences of post COVID-19: During the course of the pandemic, the scientific community assumed that COVID-19 is an acute life-threatening infection. Nonetheless, over time the reported cases with long-term symptoms increase dramatically and the chronicity of the disease emerges. As a matter of fact, it is estimated that 25-35% of people, who recovered from the acute infection, will develop post COVID-19. For example, at least 5 million post COVID-19 cases

have been documented worldwide, including 3.2 million in the United States of America (U.S.A.) and 600,000 in the United Kingdom (U.K.). The data remain unclear in the case of Greece, as the post COVID-19 is a new manifestation of the disease, which has only recently been clearly defined so that it can be recognized and studied (Long COVID Alliance, 2021).

The symptomatology of the post COVID-19 varies, as does its duration. The most common long-term symptoms include shortness of breath (77%) and fatigue (54%). Other common symptoms are presented in Table 1

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Table 1: Post COVID-19 symptoms.

Shortness of breath	Fever	Cough	Chest pain
Fatigue	Headache	Tachycardia	Numbness
Lack of taste or odor	Muscle and Joint pain	Dizziness	Cognitive disorders

Source: Mayo Clinic, 2021.

These may re-emerge after initial recovery from the acute infection or persist from the beginning with varying severity. The onset of the post COVID-19 is not related to the person's age, sex, pre-infection health status and severity of the initial episode. A slightly increased incidence is observed in middle-aged women with severe clinical manifestations during the initial infection (Yong, 2021).

The patient's clinical status contributes to the diagnosis of the post-COVID-19 and there is a risk for various complications in the respiratory system or other systems (Table 2).

Table 2: Complications of post COVID-19

Respiratory system	Pulmonary embolism Pulmonary fibrosis Interstitial lung disease
Cardiovascular system	Myocarditis Pericarditis Heart failure Acute Myocardial Infraction Arrhythmias Deep Vein Thrombosis
Central Nervous system	Stroke Guillian – Barre syndrome Amnesia Insomnia Encephalitis
Gastrointestinal system	Pancreatitis Hepatitis Cholangiopathy

	Gastrointestinal hemorrhage
Urinary system	Haematuria Proteinuria Urinary incontinence Chronic Renal Disease
Hematopoietic system	Lymphocytopenia Thrombocytopenia Disseminated Intravascular Coagulation
Psychological disorders	Anxiety disorder Panic attack Depression Post Trauma Stress Disorder Chronic fatigue or pain
Post I.C.U. syndrome	

Source: Hellenic Thoracic Society, 2022

Although the follow-up period of people with post-COVID-19 is considered insufficient to draw firm conclusions about long-term complications, the recent data on SARS-CoV2 virus and the association with previous epidemics of similar viruses, such as SARS- CoV1 and MERS-CoV, contribute to understanding the progression of the disease (Hellenic Thoracic Society, 2022). The organic complications of the post COVID-19 are a result of systemic inflammation and thrombosis. However, psychological disorders are a combination of isolation, social stigmatization, the threat of life itself and the fear of transmitting the virus to familiar people. In fact, the psychological burden on the individual leads to the somatization of symptoms, such as chronic fatigue and chronic pain (Higgins et al., 2021).The post COVID-19 increases the risk of permanent damage, thus limiting the individual's quality of life and undermining the well-being of society. For this reason, health systems worldwide are called upon to respond to this new challenge, forming specialized clinics, which will aim at the proper management of patients and their prospective follow-up. In the U.S.A., 44 post COVID-19 centers have been developed in almost all the states. Moreover, 68 post COVID-19 clinics have been established in the U.K. and a post COVID-19 rehabilitation center in Germany (Survival Corps, 2021).In Greece, post COVID-19 clinics have been developed in several public and private hospitals in order to meet the growing needs and expectations of people suffering from this condition. Table 3 presents the hospitals with post-COVID-19 clinics in Greece. At the Athens General Hospital for Thoracic Diseases "I Sotiria" there are 8 post COVID-19 clinics, at the General Hospital of Athens "O Evangelismos" there are 2 clinics and one clinic operates in each other hospital of the country. Consequently, 14 of the 30 post COVID-19 public clinics are located in Attica, 4 are in Thessaloniki and 12 in the rest of Greece (Hellenic Thoracic Society, 2022).

Table 3: Hospitals with post COVID-19 clinics in Greece

General Hospital of Thoracic Diseases of Athens “I Sotiria”	University General Hospital of Patras
University General Hospital of Athens “Attikon”	General Hospital of Tripolis

General Hospital of Athens "O Evangelismos"	General Hospital of Sparta
General Hospital of Athens "Alexandra"	University General Hospital of Larisa
General Hospital "Asklipio Voula"	University General Hospital of Ioannina
Health Center of Piraeus "Agia Sofia"	University General Hospital of Alexandroupoli
General Hospital of Thessaloniki "G. Papanikolaou"	University General Hospital of Heraklion
General Hospital of Thessaloniki "Ippokrateio"	General Hospital of Heraklion "Benizeleio – Pananeio"
General Hospital of Thessaloniki "O Agios Dimitrios"	General Hospital of Rethymno
Health Center of Toumpa, Thessaloniki	General Hospital of Chania
General Hospital of Giannitsa	Health Center of Samos

Source: Hellenic Thoracic Society, 2022

The development of a post COVID-19 clinic at the U.G.H.I. The U.G.H.I. is a public regional hospital and is administered by the sixth Health District. The U.G.H.I. is responsible for the tertiary health care of the citizens of Epirus and the Ionian Islands, whose population exceeds 500,000 people. In fact, it has departments of all medical specialties and is an educational and research center (U.G.H.I., 2017).

To begin with, in the specialized post COVID-19 clinic, equality in accessibility and availability of health services will be ensured regardless of social or economic status (Lahana, 2020). The health services of the clinic will address to people with clinical or laboratory diagnosis of COVID-19, who have recovered either at home or at a hospital in a conventional bed or in the Intensive Care Unit (I.C.U.) and there is a suspicion of having post COVID-19. Since the person is hospitalized for COVID-19 at U.G.H.I. or in another hospital, should be regularly re-checked in the clinic's outpatient clinics for a period of 12 weeks, in which the symptoms of post COVID-19 usually appear. Nevertheless, the person who recovered from the initial infection of the virus at home should be examined first by the family doctor and then referred to the specialized clinic. This is because the family physician must rule out life-threatening conditions and make a differential diagnosis between COVID-19, post COVID-19 and some other diagnoses. The examination of the individual in the regular outpatient clinics will take place after a scheduled visit and will include his complete medical record, clinical examination, laboratory tests and chest X-ray. The planning of the visits will take place through telephonic or electronic communication with the clinic secretariat to properly serve the individual (NHS, 2021).

The specialized clinic will be part of the internal medicine sector of the U.G.H.I. and will be in direct collaboration with the clinics of infectious diseases. The health services of the post COVID-19 clinic include the treatment of symptoms, the prevention of complications, the rehabilitation, and the psychological support of the patient. In order to meet the sundry needs, which arise, it is deemed necessary to form interdisciplinary groups, where each member will contribute to the achievement of the clinic's goals from his own perspective (Table 4).

Table 4: The specialized healthcare team in the post-COVID-19 clinic

Infectious disease specialist	Neurologist	Occupational therapist	Nutritionist
Pulmonologist	Psychiatrist	Speech therapist	Nurse
Cardiologist	Gastroenterologist	Physiotherapist	Pharmacist
Radiologist	Endocrinologist	Psychologist	Support Staff

Source: National Health Service, 2021

For example, physicians of different specialties should work together harmoniously to address the wide range of organic and mental disorders of the disease. Their work will be complemented by the nursing staff and the rehabilitation team (Physiotherapist, Speech Therapist, Occupational Therapist, Psychologist, Nutritionist).

The recovery team will create a personalized plan to achieve self-care and if possible, to fully restore functionality in each incident. Undoubtedly, the contribution of the psychologist will be decisive in dealing with depression and other mental disorders, as well as in restoring the self-confidence of the person after a serious threat to his health. The operation of the clinic will be completed by support staff, for example secretaries, cooks, bankers and cleaners, while the administrative staff will coordinate this whole effort (UPMC, 2021).

The post COVID-19 clinic will provide the opportunity of hospitalization for cases that need continuous monitoring of their vital functions through modern biomedical equipment, while the clinic's hotel facilities (rooms, beds, food) will offer a comfortable stay. In the occasion that the person feels that their condition is worsening, or a similar change is recorded by the monitoring equipment, the medical staff will be informed immediately to intervene. Along with the person's hospitalization, their companions will be accommodated in a guest house that will cooperate with the U.G.H.I., so that they can visit and support them. The patient will remain hospitalized until their symptoms subside and a satisfactory restoration of their functional level is achieved. In addition, the clinic will record the demographic and clinical data of people with post-COVID-19, who are examined in outpatient clinics or hospitalized, after their consensus. Thus, the data may be analyzed in studies aimed at understanding the disease and supporting the funding. In fact, every citizen will have open access to this data in order to inform and raise awareness of society for the post COVID-19 (Yale Medicine, 2021).

From the analysis of the internal and external environment of U.G.H.I., the strengths, weaknesses, opportunities and threats of developing a post COVID-19 clinic will arise, that is a SWOT analysis (Table 5).

Table 5: SWOT analysis for the development of a post COVID-19 clinic at U.G.H.I.

Strengths	**Weaknesses**
• Prestige and credibility of the hospital • Highly trained staff • Innovation of provided health services • High quality health services • Holistic approach to patient needs by specialized teams	• High operating costs for only a particular condition • Financial deficit • Lack of space, so additional resources will be needed for possible expansion

• Modern building facilities and biomedical equipment • Research and Education on post COVID-19 • Feedback from patients and staff through monitoring systems	
Opportunities	**Threats**
• Funding from the E.U. to stop the pandemic • Deficit adjustment • Creation of a network of post COVID-19 health units nationwide and across E.U. exchanging knowledge and experience • Upgrade of the health services and administrative functions of the U.G.H.I. • E-Health (Telemedicine) • Public and private sector partnership	• Economic instability due to the pandemic • Understaffing of other departments of the hospital • Bureaucracy • Increased incidence of post COVID-19 in the area of responsibility

Table 6: The planning process of the post COVID-19 clinic at U.G.H.I.

Step	Activity
1. Defining the objectives	The goals of the post COVID-19 clinic include treatment, prevention of complications, rehabilitation, and studying of the disease.
2. Development of alternative solutions for the implementation of each objective	The clinic may be installed in an existing part of the hospital or in an extension of the building. The necessary equipment may come from other clinics of the hospital with a light workload or new equipment may be purchased. The staff may be moved from other related clinics, such as internal medicine or pulmonology. Alternatively, new staff may be hired. The financing of the development and operation of the clinic may come from a European Union subsidy, through the Recovery and Resilience Facility (R.R.F.), from a governmental grant or from contribution in the context of corporate social responsibility.
3. Investigating the conditions and premises for each alternative solution	Limited financial resources do not allow a large amount to be allocated for the development of the clinic. Despite that, the health services provided should be of high quality and worthy of the prestige of the hospital in order to meet the needs of the patients.
4. Evaluation of the alternative solutions	The installation of the clinic in an existing part of the hospital will not financially burden the development plan, but the space is not sufficient for the inpatient and for the outpatient unit. The purchase of new equipment will ensure technological modernization and the adoption of new methods, but the cost will increase significantly. The transfer of personnel from other clinics will create understaffing problems and will foment their harmonic operation, even though it will normalize the cost (VDH, 2017).

5. Choosing the optimum alternative	The specialized clinic should be split so that the outpatient unit and the triage are installed in an extension of the hospital, while the inpatient unit will be located within the hospital. New biomedical equipment and supplies should be procured through competitive tendering of prospective suppliers, ensuring transparency and fairness of the transaction. Staff recruitment will be implemented through evaluation and grading of the candidates. The combination of funding sources is necessary to achieve the clinic's goals due to the financial crisis from the pandemic.
6. Formulation of individual plans to achieve the final goal	The publication of data on the etiology and frequency of visits to the clinic will provide information to the society about the post COVID-19 and will promote health. Also, the clinic will be a research center for post COVID-19.
7. Implementation of planning	The flow of the management process should be constant by organizing the plans, leading the people and checking the progress. If the effectiveness of the plans is found to be insufficient, there is the possibility of revising and implementing an alternative solution. For this reason, it is stipulated that a quality assessment will be carried out in 2 months and an economic assessment in 12 months from the beginning of the clinic's operation (Sigalas, 1999).

Source: Polizos, 2014

The SWOT analysis is the basis on which the future strategy of the clinic will be conducted and its identity will be defined (Polizos, 2014).

The planning of a post COVID-19 clinic at U.G.H.I. Planning is defined as the process of determining the objectives of an organization and the methods of achieving them. Planning is the first and most important stage of management, because it lays the foundations for the subsequent stages and defines the direction of the organization, just like a compass. The planning process follows a specific series of steps and in this way the planning of the post COVID-19 clinic at U.G.H.I. will be presented (Table 6) (Koutouzis & Sigalas, 1999).

Conclusion: Post COVID-19 is a chronic syndrome caused by the SARS-CoV2 virus and is responsible for a rise in mortality and morbidity in the population. Cases are increasing daily globally as the COVID-19 pandemic continues to spread inexorably. The development of specialized post COVID-19 clinics is fundamental to the management of these incidents, as their benefits are highlighted through the example of a specialized clinic at U.G.H.I. In spite of that, the true extent and severity of the disease remains unexplored. Due to these parameters, prospective cohort studies of people with COVID-19 should be implemented through an international network of specialized clinics, in order to understand and optimally manage the post-COVID-19 and other manifestations from the pandemic.

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