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The Impact of the COVID-19 Health Crisis in Pharmacies and Pharmacists. A Quantitative Study

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ABSTRACT

This study examines the professional and social interactions within pharmacies in the context of COVID-19 pandemic, a global health crisis with lasting impacts. COVID-19 has generated a unique body of data, altered patient behaviours, and introduced new healthcare references. The aim of this paper is to highlight the critical role of pharmacists and pharmacy staff during that period. It explores the skillsets and resources these professionals possess, the support systems available to them, and the challenges encountered in their daily operations. Additionally, the research examines established practices and the effects of pandemic management strategies on pharmacies. The work focuses on the impact of the COVID-19 pandemic, specifically analysing the role of pharmacists within this context. The paper incorporates a case study conducted through primary research in the Region of Eastern Macedonia and Thrace in Greece. The objective of this case study is to elucidate the contributions and pivotal role of pharmacists (and pharmacies) during the COVID-19 pandemic, alongside the resulting impact. The research strives for both theoretical and practical significance, by presenting current knowledge, original findings, and valuable contributions to the scientific literature.

1. Introduction

Throughout history, every era has faced emergency threats, such as armed conflicts, natural or technological disasters, political instability, terrorism, etc. Governments, civil protection agencies, and civil society bear the responsibility for taking prompt action to mitigate adverse effects.

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In health crises, such as the COVID-19 pandemic, a country's national health system plays an especially critical role.

The COVID-19 pandemic, which began in late 2019 in Wuhan, China, triggered a global crisis. Since the World Health Organization declared COVID-19 a pandemic on March 11, 2020, governments worldwide have implemented measures such as masks wearing, social distancing, home isolation and suspension of work. While these measures were necessary for protecting public health, they also had far-reaching social and economic implications.

The healthcare systems and health employees were confronted with overwhelming workload and a surge in patients' numbers. In addition to hospitals and medical facilities, pharmacists played an essential role. As frontline healthcare providers, pharmacists offered first level assistance and communication with citizens, supporting the broader healthcare system. Pharmacists, as part of the community, serve as a vital link between the medical sector and the public, providing health services, medication, vaccines, and guidance.

The integration of pharmacists into the COVID-19 pandemic response plan was proven to be critical. Pharmacists offered public health services, were easily available, and well trusted by the public. They actively participated in the fight against the pandemic by administering COVID-19 tests and offering remote counselling primarily over the phone. The involvement of pharmacists in the pandemic response strategy has been proven to have aided in recovery efforts[1].

Pharmacists play a vital role in public health by promoting health, providing counselling and patient care, dispensing medications, and supporting the healthcare system[2]. Pharmacies have evolved into more general service centres that provide additional health services, including non-prescription services[3].

Pharmacists have a wide range of knowledge and abilities, from managing pharmacy operations to clinical care. They balance the supply and demand for medicines, offer delivery services, and participate in research and monitoring of adverse drug effects[4]. They can work in hospitals, health administrations, pharmaceutical firms, or as freelancers, among other settings[5]. Their role, until a decade ago, particularly in emergency situations, has not differentiated significantly since the 1960s; historically, their work was largely limited to the supply of medicine, while patient and integration management were carried out at a local level[6]. Recent studies have demonstrated that pharmacists, in addition to providing medicines, play a critical role in healthcare by communicating with patients, monitoring treatment, promoting vaccinations, and ensuring the prudent use of medication[7]. To enhance these services, it is imperative to improve cooperation between healthcare professionals at all levels, including Pharmacist Cooperatives, the World Pharmaceutical Federation (FIP), the Medical Reserve Corps (MRCs), and others.

At a global level, the availability of pharmacists varies, with many countries having fewer than 5 pharmacists per 10,000 citizens[8]. In the European Union, most countries report 50 to 110 pharmacists per 100,000 citizens[9]. In Greece, the distribution is around one pharmacist per 1,000 citizens, which has increased over the past 15 years up to 2019, from 8.42 per 10,000 to 10.85 per 10,000. This makes Greece, where the pharmacy community is competitive and pharmacists must recognise the importance of strategies employed to ensure customer satisfaction in a free market, one of the countries with the highest number of pharmacies per citizen in Europe[8,10,11].

The COVID-19 pandemic underscored and amplified the crucial role of pharmacists in healthcare. Pharmacists contributed significantly to recovery efforts by supporting both the healthcare system and the community[1, 4]. They provided vital information, guidance on prevention methods, and advice on proper use of medications[12, 13]. Pharmacists played a pivotal role in containing the spread of COVID-19 and they contributed to the overall relief of the healthcare system and that experience is expected to lay the foundation for the further development of the profession[14-16].

In areas severely impacted by the pandemic, where access to doctors and hospitals was limited, pharma-

cists often served as the first point of contact for individuals concerned about their health or seeking reliable consultation. In some cases, such as in France, regulations regarding the repeatability of prescriptions were amended to facilitate access. Pharmacists stood on the frontlines, providing essential services like dispensing medications, offering consultations, educating patients, and promoting guidelines on preventing and containing infections - even when most daily services were locked down or restricted[7], despite facing numerous and sometimes conflicting government mandates that created confusion[17]. During the pandemic, pharmacists in their communities remained a trusted and accessible source of healthcare for the public[18, 19]. They also played a critical role in reporting timely and realistic data regarding the sales and shortages of medicine[20].

Globally, pharmacists have faced various emergencies, including pandemics and natural disasters, demonstrating their ability to adapt to new challenges[21]. However, the official recognition of pharmacists in disaster management remains limited[22, 23].

Research indicates that pharmacists were eager to contribute to managing the COVID-19 pandemic and believed they provided substantial value to patients and the healthcare system[24]. Improved communication and pharmacy management emerged as critical factors for successfully addressing the pandemic and other public health emergencies[25, 12]. Despite not always being acknowledged by the media, politicians, or society, they worked continuously and intensively to provide essential healthcare services and guidance on medical treatment[26, 27]. In some instances, the adverse conditions in the pharmacy were exacerbated by ethical dilemmas and, in extreme cases, harassment due to COVID-19-related racism[28].

The pandemic highlighted the urgent need for continuous education, training, and professional development for pharmacists to the forefront. According to Gregory and Austin[29] and John[5], their role in public health and their collaboration with other healthcare professionals, were widely acknowledged in practice. The experience gained during the pandemic is expected to strengthen their position in the healthcare system in the future. The pandemic highlighted the need to strengthen collaboration between pharmacists and other health professionals, as well as to develop new skills and practices to help address future health crises[3]. Pharmacists adapted quickly to new conditions and took on additional responsibilities and have demonstrated their ability to fill significant gaps in healthcare by offering services such as treatment monitoring and support for patients with chronic illnesses[30, 4]. The knowledge levels of hospital and community pharmacists regarding COVID-19 were found to be nearly identical, regardless of their work setting[13]. Therefore, the profession of the pharmacist demands an expansion of its role in the healthcare system, including professional growth, adequate training, resource provision, access, equity, and recognition through concrete actions[31, 32].

In Greece, pharmacists' role and responsibilities as healthcare professionals also include giving patients and individuals the proper advice and guidance providing pharmacological treatment[33]. Pharmacists in Greece also played a key role during the COVID-19 pandemic, by providing critical health services and assisting the healthcare system. Their involvement in pandemic management reduced hospital congestion and improved patient access to medications and other medical services[10]. Pharmacists in Greece faced increasing demand for prescription and non-prescription medications, as well as medical products, while also contending with shortages and other challenges, issues that were common in most countries. Despite the limitations, pharmacists remained committed to delivering high-quality services and promoting public health in their communities[20].

The post-COVID era presents brings along new challenges and opportunities for pharmacists, with the need for ongoing education and professional development being more imperative than ever. Pharmacists will continue to play a central role in healthcare, providing important services and supporting the health of their communities[17].

The main limitation of the available literature is the short time between the COVID-19 pandemic crisis and the return to normality. At a certain distance in time, it may be worthwhile to conduct similar research to identify updated views on the topic.

In this study, we investigate the role of the profession of pharmacists and examine the activity of pharmacies in the community during the COVID-19 pandemic. We observe the pharmacists' practices and actions, and assess the impact of the pandemic on pharmacies. The objective of our research is to examine and evaluate the role of pharmacists in the health crisis in Greece, where they are highly accessible, and how they contributed to public health during the crisis.

To achieve our goals, we conducted a primary quantitative research by distributing questionnaires to be filled by pharmacists (and pharmacy employees), located in the region of Eastern Macedonia and Thrace in Greece. We collected responses from a representative sample of pharmacies of various sizes and characteristics, and statistically processed and analysed the data to generate results, findings and important conclusions.

The findings of this study are expected to contribute to the existing body of relevant scientific knowledge.

2. Material and methods

Research design methodology and sampling

Primary research (quantitative research method) and data collection were conducted through electronically distributed structured questionnaires answered by pharmacists and pharmacy employees (research participants) in the Region of Eastern Macedonia and Thrace. The study used a representative sample of pharmacies varying in size and characteristics. The quantitative approach based on sample research, enabled the researcher to reach a substantial portion of the population to support the study's objectives effectively.

The target population (survey sample) included pharmacists and pharmacy employees with relevant experience and knowledge, thereby ensuring valid and reliable responses. The sample size was calculated using data from the Greek Statistical Authority (ELSTAT), resulting in a final sample of 72 pharmacies (pharmacists and pharmacy employees participants) representing 12.65% of the total population of 569 pharmacies in the area (630 graduate pharmacists)[34]. This ensured a high and representative response rate, especially for our homogenous population.

The survey's limitations included the questionnaire's potential complexity and the nature of the business objective, both of which may have influenced responses. However, the meticulous design and thorough data analysis guaranteed the reliability and validity of the results.

Research questions

The research questions were: 1. Did pharmacists and their staff possess the knowledge required to manage the COVID-19 pandemic? 2. Were pharmacies equipped with adequate resources and supplies to operate effectively during the COVID-19 pandemic? 3. How did pharmacists and pharmacies contribute to pandemic control, and what specific practices did they employ? 4. How and to what extent did the COVID-19 health crisis impact pharmacists and pharmacies across different sectors? 5. How were pharmacies affected and what benefits did they gain from the health crisis? 6. What were the pharmacists' perspectives on new practices in pharmacies in the post-COVID era?

Research tool for collecting primary research data

The questionnaire was designed to highlight the contribution of pharmacists (and pharmacies) during the COVID-19 pandemic. The design of the structured questionnaire was done in an appropriate manner, to ensure clear correlation of the questions with the overall scope of the research, maintaining a logical flow and sequence that aligned with the study's objectives[35]. In addition, the questionnaire also aimed at maximising the objectivity, validity and reliability of the respondents' answers, with questions designed to be goal-oriented and unbiased in order to accurately address the research questions.

The questionnaire included 25 questions divid-

ed into two sections: demographic information and questions related to pharmacists' professional activities during the COVID-19 pandemic. The question types were varied, including open, semi-open, and closed formats, with the option for further explanation when necessary. Multiple choice questions were included, such as Yes/No, category list, and Likert scales. The design intentionally avoided any indications, suggestions, leading questions, questions requiring sensitive information, and questions that could be misleading, to ensure high quality of data.

The distribution of the questionnaire was carried out via email using Google Forms. It was accompanied by the filling instructions and additional relevant information, including assurances of confidentiality for participants' responses. Data collection took place from November 2022 to February 2023. Pharmacists were selected based on their availability and willingness to participate, thus ensuring the representativeness and reliability of responses.

Processing and presentation techniques for research results

Data analysis was conducted using RStudio version 4.2.2, a software designed for statistical analysis and data visualization. Questionnaire data were converted into variables, followed by statistical analysis, and the generation of tables. The analysis was carried with precision and based on strictly defined criteria to avoid errors, including cumulative density charts on a Likert scale and pie and bar charts, to better illustrate the results and answer the research questions.

Research limitations

Data collection through a questionnaire presented certain challenges, such as the questionnaire's potential complexity and the nature of the business objective. Additionally, the necessity for adequate and thorough responses required careful sample selection to ensure representativeness, unpredictability, and reliability. While studying the generated data, there was a large volume of information that made it difficult to analyse and discuss in depth. Ensuring the reliability of results demanded strict adherence to the established criteria and guidelines.

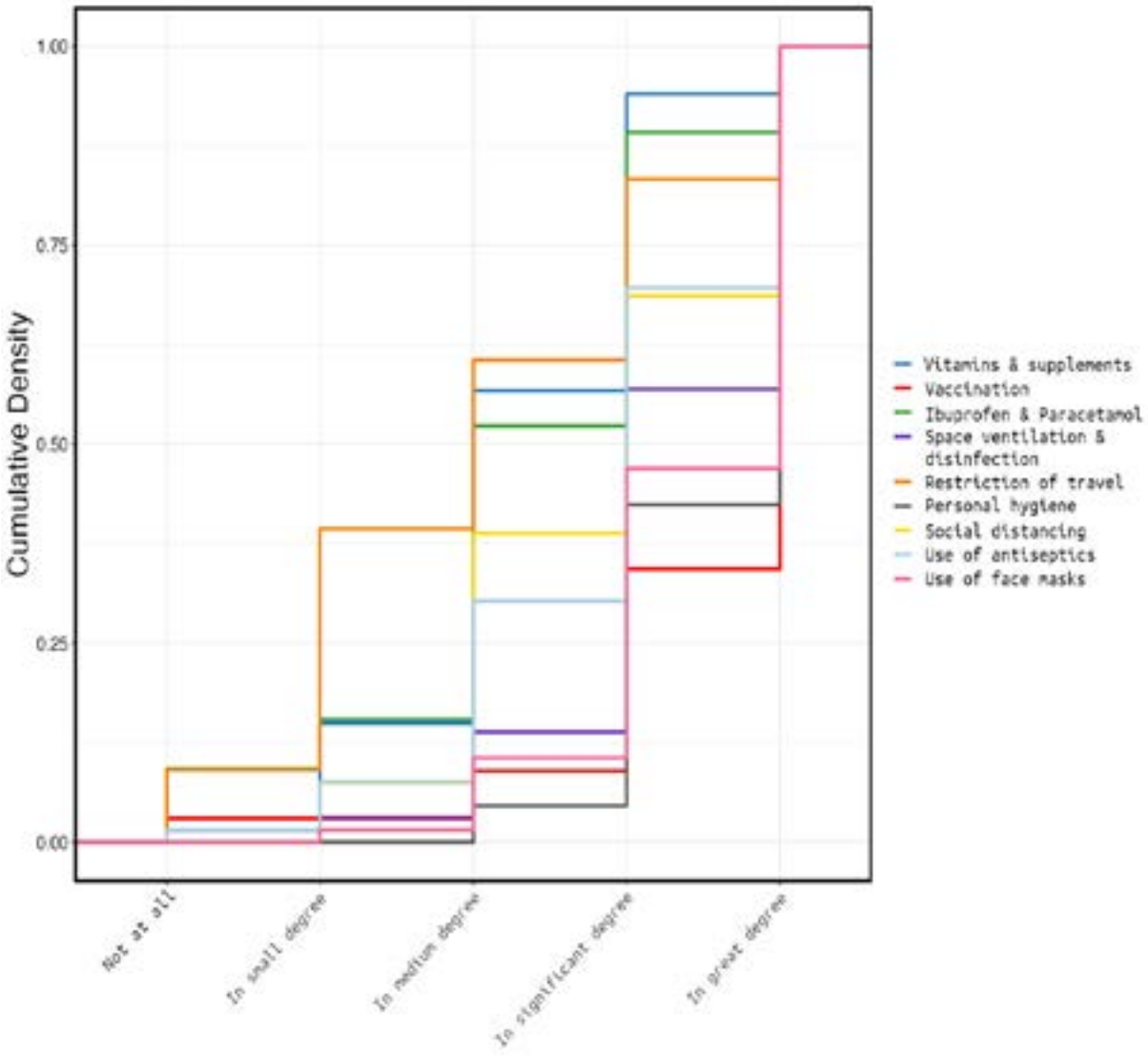
A main limitation of the research is the short time between the COVID-19 pandemic crisis and the return to normality. At a certain distance in time, it may be worthwhile to conduct similar research to identify updated views on the topic.

3. Results

Response results of quantitative survey

A total of 72 questionnaires were completed electronically. Among the 72 participants, 27 respondents were male, 42 were female, and 3 chose not to disclose their gender (1st question). The majority of respondents belonged to the age group of 30 to 49 years (70.83%) (2nd question). Most research participants held a bachelor's degree from Greek Universities (AEI) or former Greek Technological Institutes (TEI) (63.88%) of the sample (3rd question). Regarding the work specialty within the pharmacy, 75.00% of the respondents were pharmacists (4th question), with the most common range of work experience ranging primarily from 11 to 20 years (41.66%), followed by 0 to 5 years (23.61%) (5th question). On average, pharmacies had 3 to 5 staff members (55.55%), and none reported staff numbers exceeding 5 (6th question). The number of served customers or patients daily, by most respondents, ranged from 51 to 100 (55.55%) (7th question).

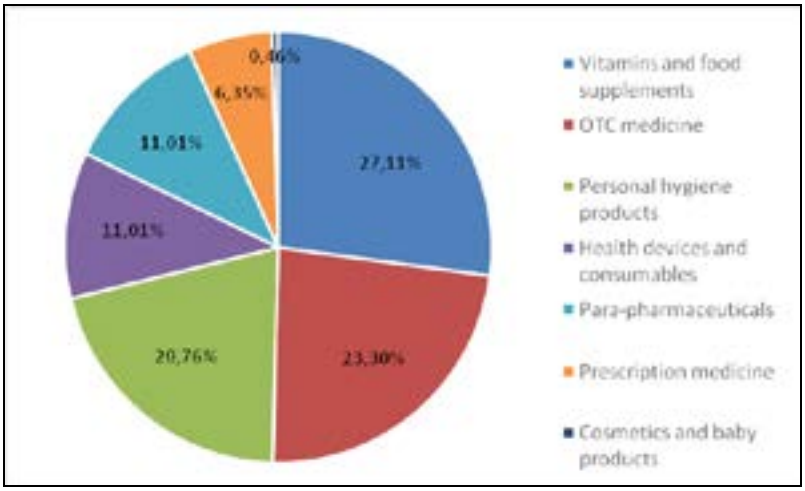
Regarding the adaptation to the pandemic, 83.33% of research participants reported that they either already had or acquired the necessary knowledge and skills during the pandemic in order to manage it effectively (10th question). Their primary recommendations for patients with a positive test diagnosis for COVID-19 included vitamins, supplements, over the counter (OTC) medicines, resting and doctor visitation (11th question). The measures that were considered most effective were: personal hygiene, the use of face masks, vaccination, and the cleaning/ventilation of premises (12th question). Respondents noted an increase in demand for vitamins, food supple-



Graph 1. *Degree of efficiency of prevention and protection measures against COVID-19 (12th question)*

ments, and Over-The-Counter (OTC) medicine, while shortages and challenges in supplies were significant (13th question). The availability of personnel, electronic systems and necessary information was sufficient for most pharmacists, although there were moderate difficulties in the supply of medicine and protective materials (14th question). Finally, pharmacists mentioned the need for better organisation and support from authorities for the efficient management of the pandemic.

Regarding the treatment of symptoms in positively diagnosed patients with SARS-COV-2 (11th question), most of participants recommended "Vitamins and food supplements" (26.38%), "Rest/Isolation of the patient" (25.00%), "Visitation to a doctor" (22.22%), and a choice of taking OTC medicine (20.37%). Moreover, 9 of respondents recommend the following of a specific diet (12.50%). Other responses, each mentioned by one respondent, included: "Testing of haemoglobin saturation", "Personalized care per case



Graph 2. *Categories of medicine and products that exhibited a raise in pharmacy demand during the pandemic (13th question)*

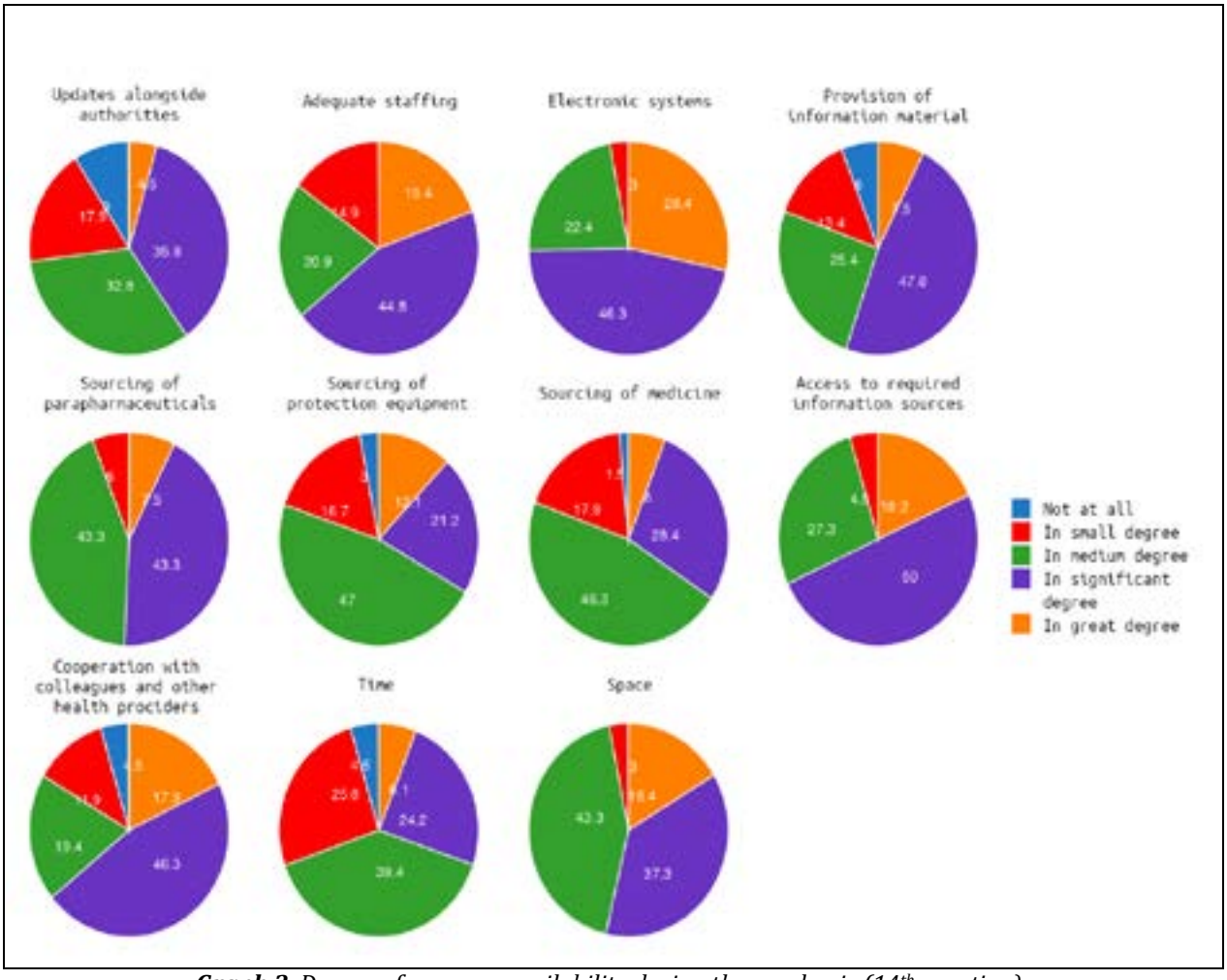
and patient history" and the consumption of "a lot of water". Lastly, nobody answered that they would not recommend any treatment measures.

Question 12 lists a number of prevention and protection measures against COVID-19, asking research participants to rate their perceived effectiveness (Graph 1).

The categories of medicine and products that exhibited a raise in pharmacy demand during the pandemic (13th question) were, in descending order: vitamins and food supplements (27.11%), OTC medicine (23.30%), personal hygiene products (20.76%), health devices and consumables (11.01%), para-pharmaceuticals (11.01%), and prescription medicine (6.35%). It is noted that, cosmetics and baby products, based on the answers of the respondents, did not exhibit an increase in demand during that period (Graph 2).

The 14th question (Graph 3) assessed the availability of resources during the pandemic. Most research participants indicated that sufficient human resources were a largely available (41.66%) and electronic systems were accessible to a large degree (43.05%). Working and time availability were rated as medium (40.27% and 36.11% respectively). Access to essential sources of information and briefing was rated as largely available by almost half of the respondents (45.83%). The provision of informational material (leaflets, guides, seminars, etc.), both digital and physical (e.g. leaflets, guidelines, seminars) was also deemed highly important (44.44%). Cooperation with colleagues and other healthcare providers was noted available to a large degree (43.05%), as well as briefing and cooperation with authorities (33.33%). Sourcing of medicine was a moderately accessible resource for most of the participants (43.05%), sourcing of para-pharmaceuticals was to a large degree available for most (40.27%), and the sourcing of protection materials (masks, gloves, antiseptics, thermometers, etc.) was of medium availability for a large part of respondents (43.05%).

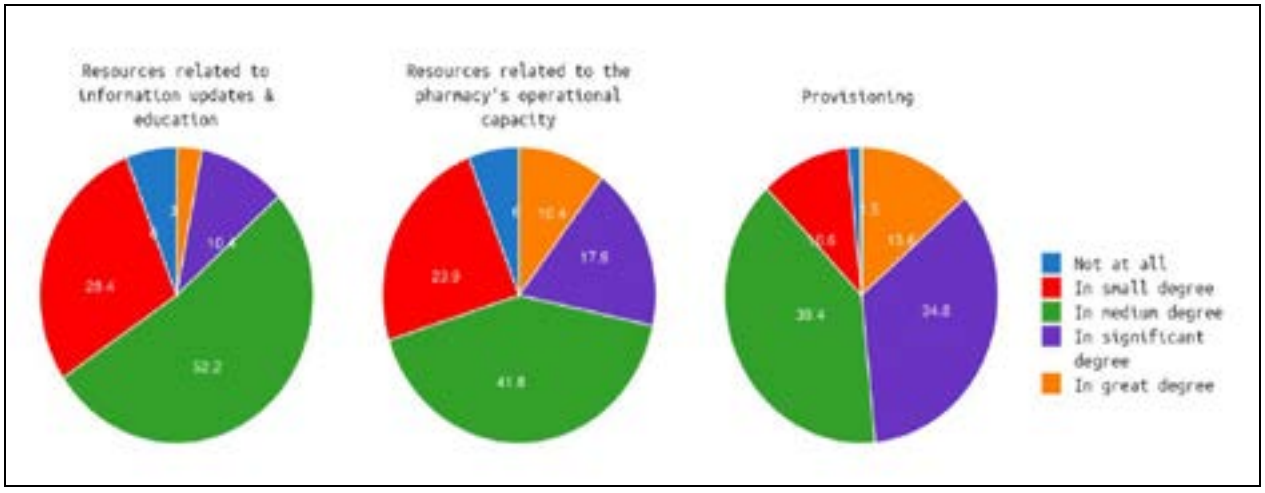
The 15th question (Graph 4) investigated and analysed the degree of difficulty created due to the possible scarcity of specific resources in the everyday work of pharmacists during the pandemic. For resources related to pharmacy operations, a medium degree of difficulty was reported by 28 out of 72 research participants (38.88%). Briefing and education also caused medium degree of difficulty for 35 individuals (48.61%). The degree of difficulty in provisioning challenges was medium for 26 respondents (36.11%), though an important percentage of 31.94% of participants (23 individuals) encountered a large degree of difficulty due to scarcity of this re-



Graph 3. *Degree of resource availability during the pandemic (14th question)*

source. Lastly, in person communication with colleagues and partners created medium difficulty for 27 pharmacists (37.50%).

The 16th question (Graph 5) was about the actions undertaken by pharmacists during the pandemic, with multiple choice responses allowed. The most common answer "I have ensured continuity in the provision of related products such as face masks, disinfectants, thermometers, etc." was denoted by 79 positive answers (20.60%). Other actions taken by pharmacists, included: "I have ensured continuity in the provision of medicine" by 52 positive answers (13.60%), "I have ensured continuity in patient care" by 48 positive answers (13.15%), "I have educated the community in topics of personal and environmental hygiene" by 48 positive answers (12.50%), "I have prepared to refer suspect patients as per protocols developed by a health authority" by 38 positive answers (9.90%), "I have cooperated with other health professionals in the provision of care and support to patients" by 36 positive answers (9.40%), "I have provided education to the community to minimise panic" by 30 positive answers (7.80%), "I have participated in state strategies for managing the disease" by 28 positive answers (7.30%), "I have called upon public authorities for information on the progress of the disease" by 4 positive answers (1.00%), and "I have performed active tracking of suspect



Graph 4. *Degree of difficulties and/or possible absence of available resources in daily work during the pandemic (15th question)*

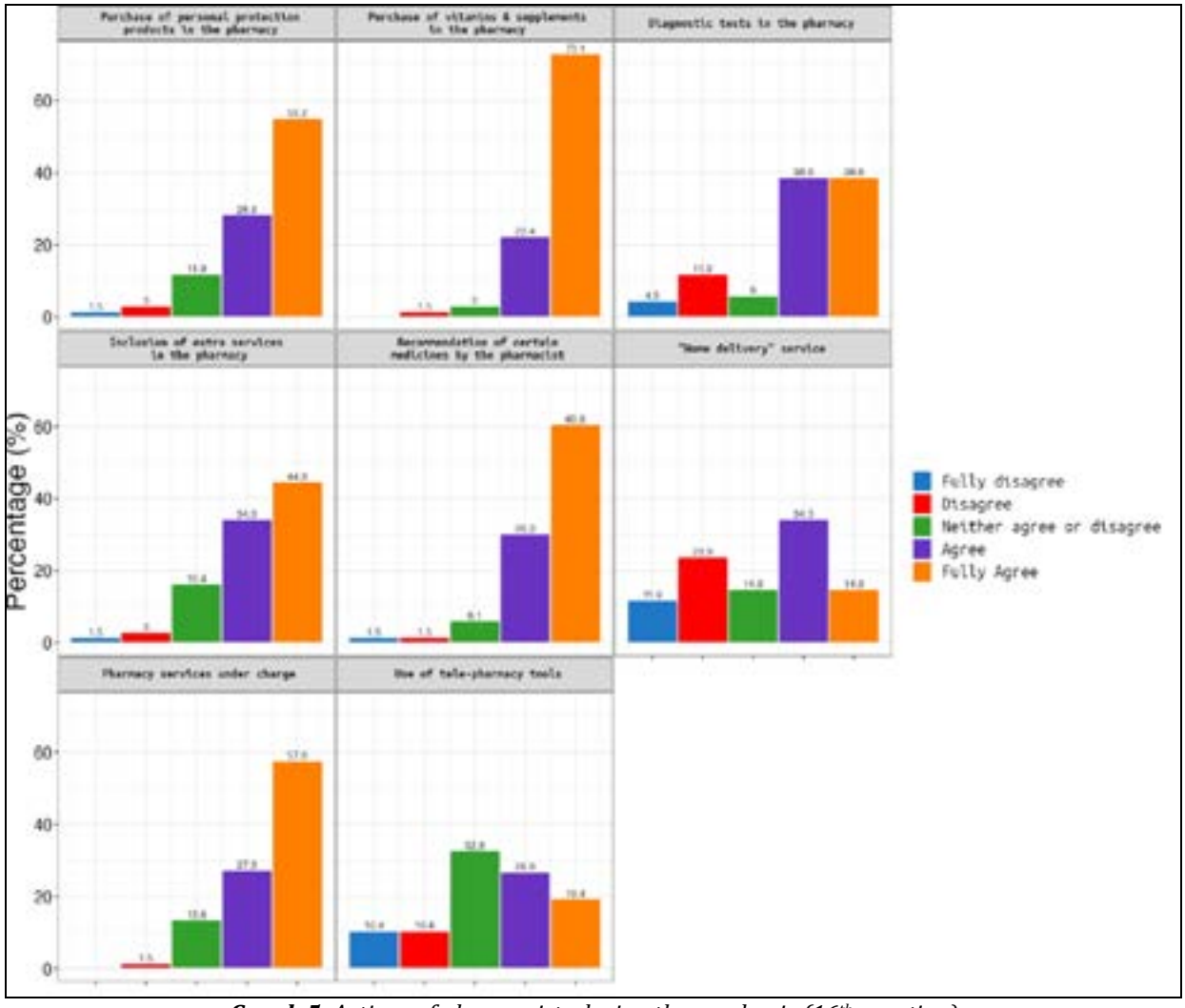
cases in the general public" by 13 positive answers (3.40%).

Question 17 (Graph 6) was about investigating the degree of satisfaction regarding the response time offered by the government for the following actions of dealing with the pandemic and the following was recorded: 43.05% responded that they were highly satisfied as they had enough time to signify and educate customers on social distancing and other actions. Additionally, 34.72% managed, at a high degree and in time, to provision material such as masks and antiseptics to serve customers and the response time afforded for adopting self-protection and employee-protection measures was highly satisfactory for 33.33% of participants. The immediacy of the announcement regarding SARS-COVID-19 diagnostic tests being performed via pharmacies was satisfactory for 37.50% of respondents and regarding vaccinations, most responses expressed high satisfaction (45.83%) and very high satisfaction (23.61%). Regarding the ease of use of digital prescriptions services, 40.27% responded as highly satisfied and 34.72% as very highly satisfied. Lastly, expanding the hours of operation of pharmacies was highly satisfying for 31.94% of research participants.

The respondents' opinion regarding specific actions, related to practices towards dealing with the pandemic and the contribution of pharmacies/pharmacists (18th question), was deemed neutral towards the use of tele-pharmacy tools (30.55%). 31.94% of the participants agreed with the provision of "home delivery" services, and 36.11% agreed that COVID-19 diagnostic tests were better performed at pharmacies. Regarding the purchase of products such as supplements and vitamins at the pharmacy, most respondents agreed (68.05%), and 51.38% agreed that products such as masks, gloves, antiseptics should be purchased at the pharmacy. Most of the participants (55.55%) agreed that recommendations regarding certain types of medicine related to COVID-19 could take place by the pharmacist and they deemed it agreeable for more services to be provided in the pharmacy, responding "definitely agree" at 41.66%. Additionally, 52.77% of respondents strongly supported offering certain pharmacy services (e.g. vaccinations) for a fee (Graph 7).

The 19th question investigated the role of the pharmacist from their perspective, on how important it is for them to have an active role in the management of the pandemic. Almost half of them (48.61%) considered their active participation and their role as very important, with 23.61% considered it as "Extremely important", 18.05% as "Moderately important" and only 2 indicated that their role is of little or no importance. In this question, 6 people did not respond (Graph 8).

In question 20 -multiple choice answer type of question- (Graph 9): 54.16% of the research participants



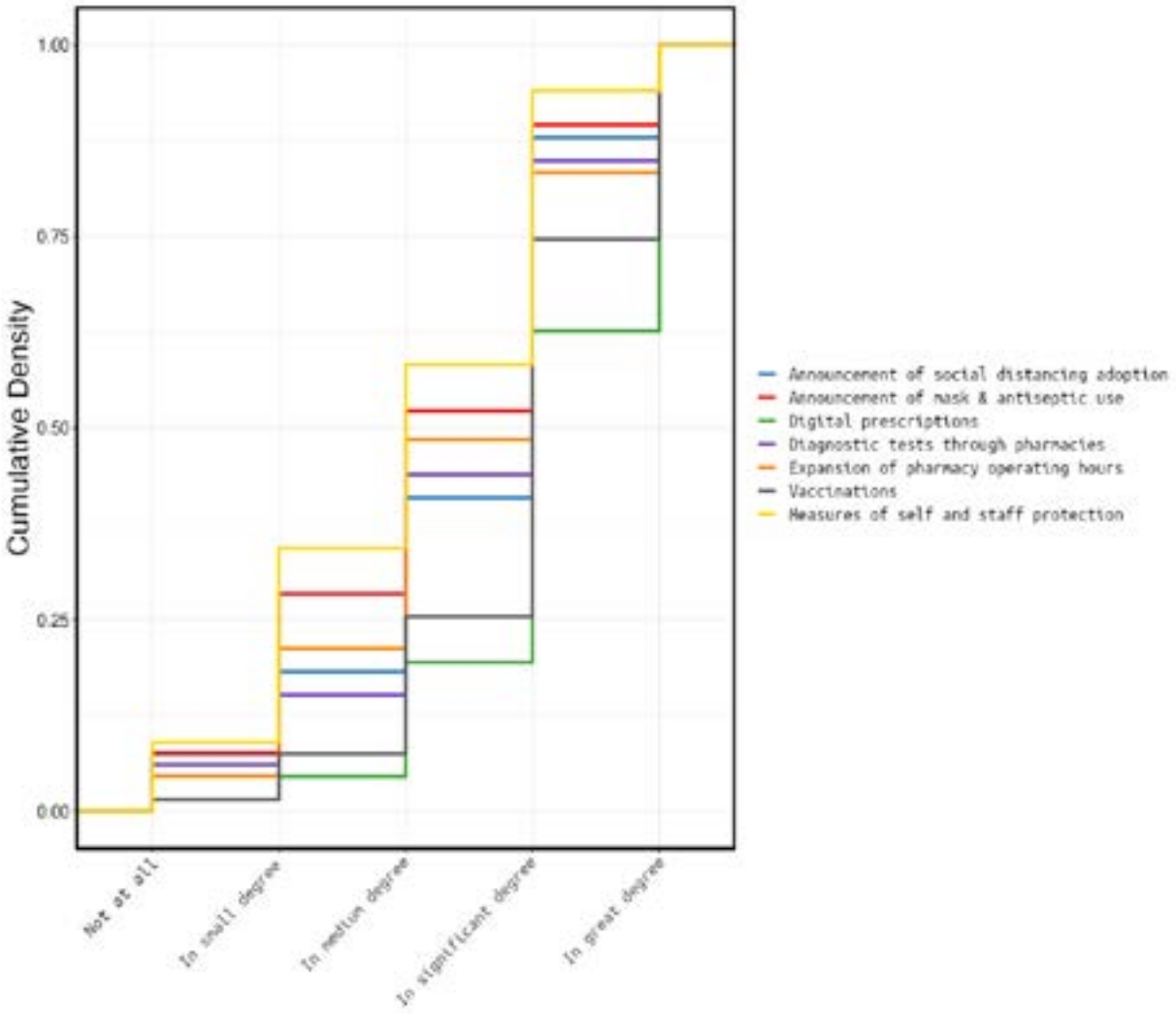
Graph 5. *Actions of pharmacists during the pandemic (16th question)*

viewed their role as very important for their family, 45.83% considered it very important for their colleagues, 51.38% considered it very important for their partners. Accordingly, 51.38% of the sample noted their role as very important to other health professionals, 52.77% considered their role very important for their patients and clients, 44.44% characterised their role as very important to the community, while 43.05% indicated that their role had a significant impact on the country.

In the 21st question: "How did participation in managing COVID-19 affected your role as a pharmacist?" (whether it upgraded, expanded, hindered, did not change it or otherwise), 36 persons (50.00%) answered that the pandemic expanded their role, while 2 persons (2.78%), answered that it did not change it and 1 person (1.39%) answered that it both expanded and hindered their role. Six persons did not respond (Graph 10).

In question 22, research participants noted that their daily work life had differentiated during COVID-19, as the workload in pharmacies exhibited a large increase according to 41.66% of respondents in the sample and exhibited a very large increase according to 40.27% (Graph 11).

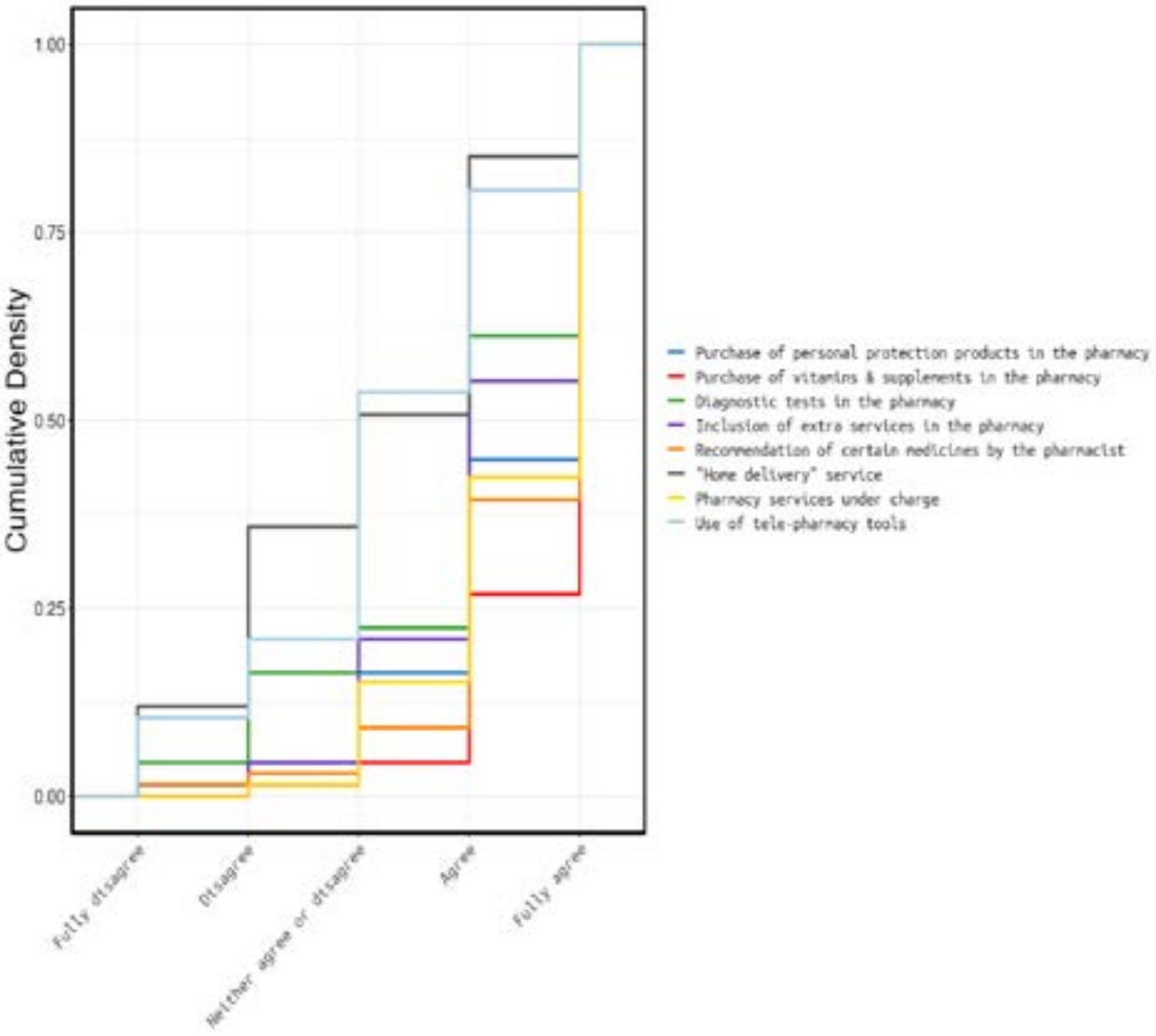
In addition, repercussions recorded due to the



Graph 6. *Degree of satisfaction regarding the response time offered by the government for actions of dealing with the pandemic (17th question)*

pharmacist's participation in managing and dealing with the pandemic by sector (question 23), were negative in the psychological sector / psychological condition for 37.50% of research participants, and also negative in regard to bodily fatigue and exertion for 61.11%. Oppositely, in regard to positive repercussions / positive impact of pandemic management, patient and customer relations in the pharmacy were marked as better/improved for 56.94% of respondents, 52.77% of them indicated that the situation led to advantages in economic matters, 59.72% of them viewed as positive the gain of knowledge and skills related to educational issues, as well as positively marked was the gain of experience (62.50%). Lastly, the repercussions of the pandemic were marked as neutral for about the half of the sample (51.38%) with regards to their relations with their family and friends (Graph 12).

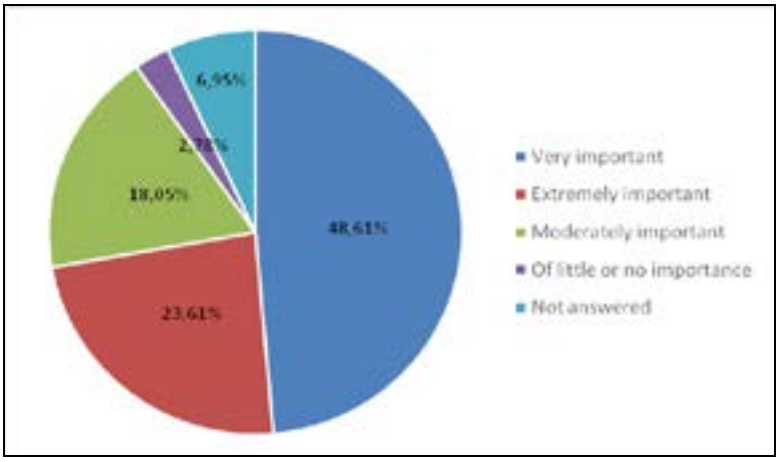
Question 24 examined perceived business opportunities during the pandemic. In descending order, most responded that they had the opportunity to develop relationships based on trust with patients (17.57%), economic development (14.69%), opportunity of expanding clientele (14.69%), opportuni-



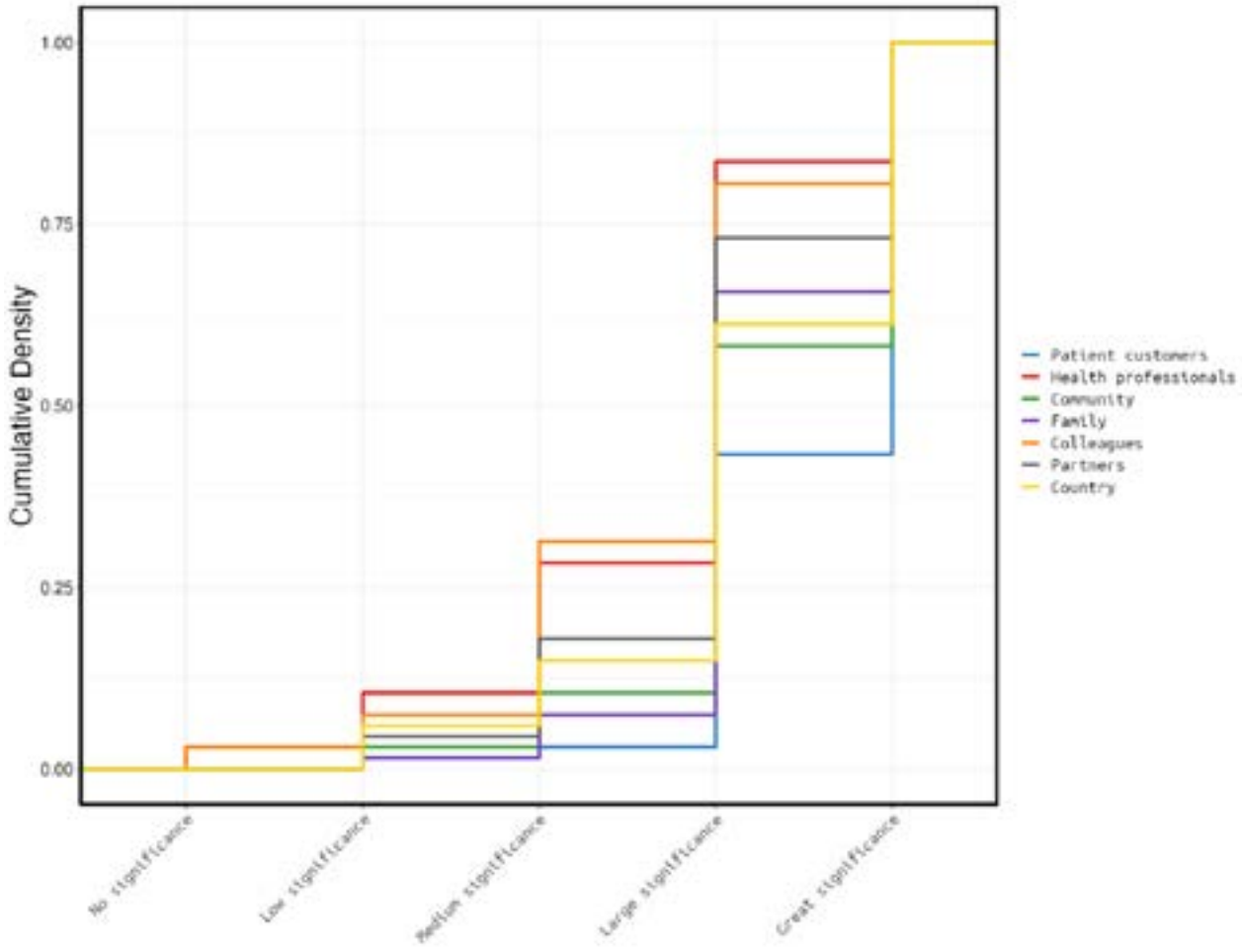
Graph 7. *Activities and practices for dealing with the pandemic and the participation of pharmacies/pharmacists (18th question)*

ties in education (13.09%), new capabilities in serving clients (12.18%), a switch in orientation and/or the expansion of products/medicine (11.50%), development of relationships with health personnel (8.30%), and lastly, development of relationships with colleagues and partners (7.98%) (Graph 13).

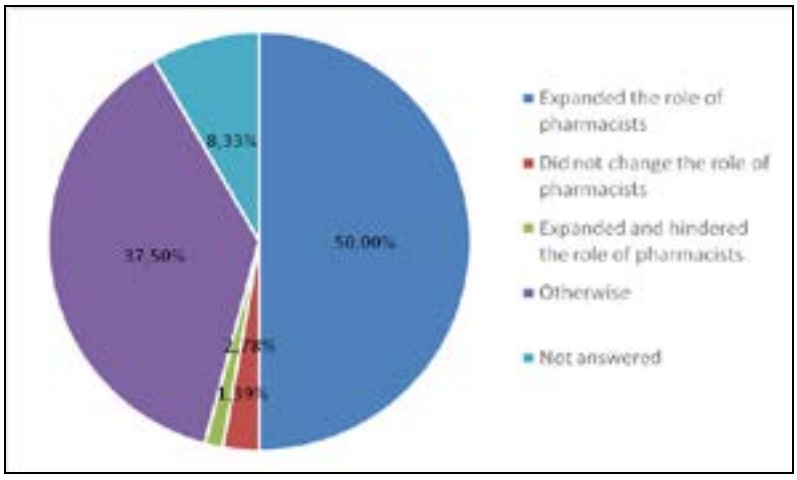
The last question of the questionnaire (25th) concerned to what extent pharmacists considered it possible to carry out the following practices in Greek pharmacies (multiple-choice question). The responses and numerical/statistical results were as follows: 37.50% of the sample considered it is fairly viable to build laboratory facilities with specifications in pharmacies, 37.50% also considered it moderately feasible to add management services for medicine regimes, and 44.44% of the sample rated tele-pharmacy counselling as moderately feasible. Subsequently, the implementation of an appointment-based service system was considered of moderate importance (29.16%), while many pharma-



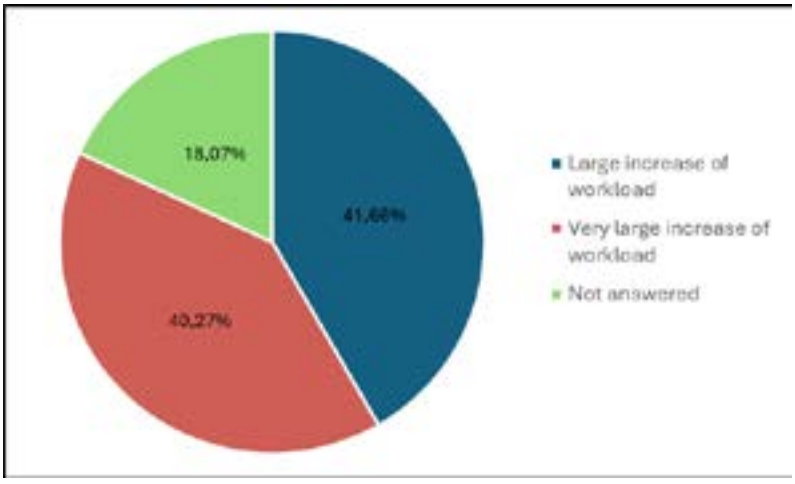
Graph 8. *Importance the role of the pharmacists (own perception) (19th question)*



Graph 9. *Assessing the pharmacists' role in dealing with the pandemic (20th question)*



Graph 10. *Impact of the participation in managing COVID-19 on the role of the pharmacists (21st question)*

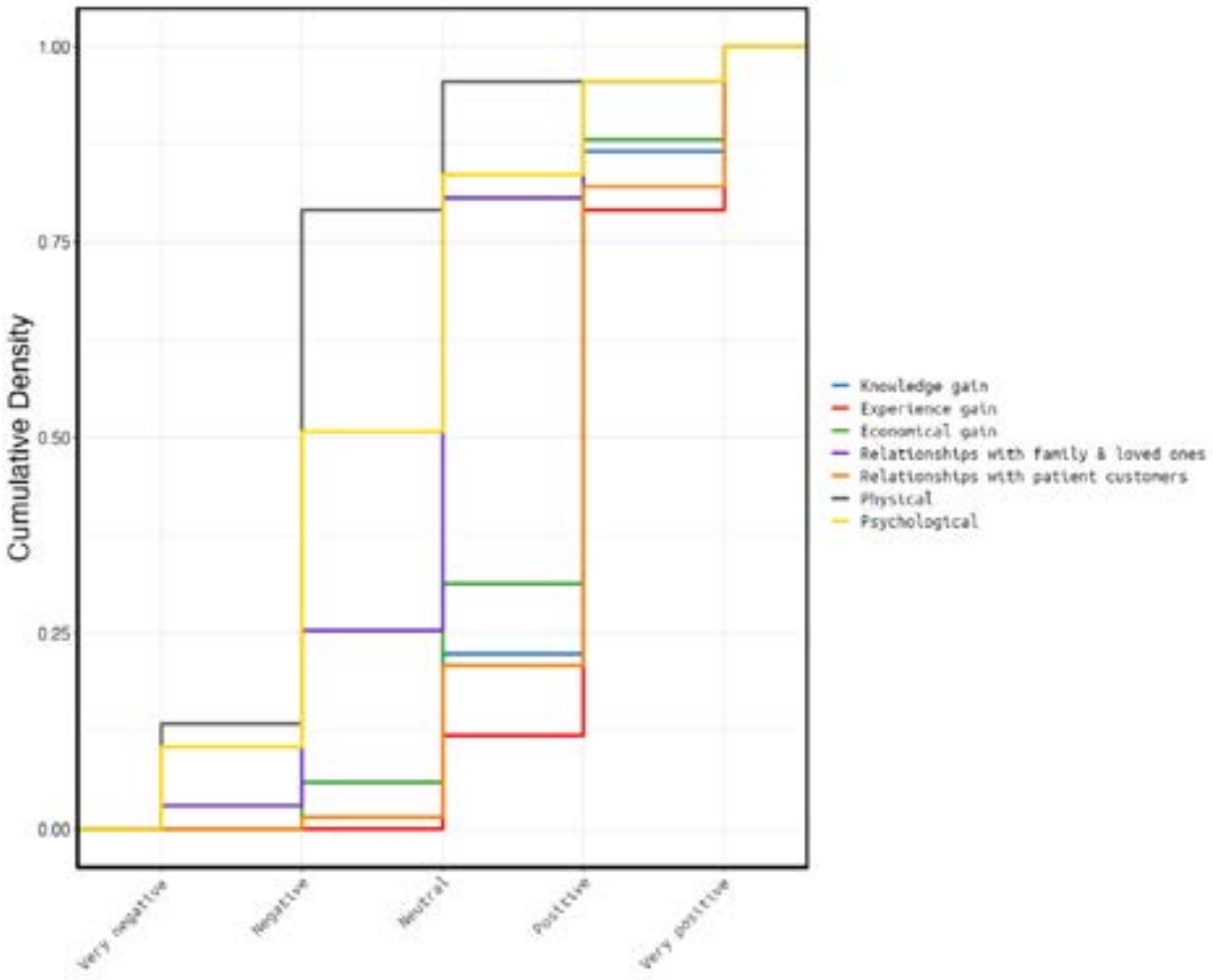


Graph 11. *Differentiation of daily work life (22nd question)*

cists (41.66%) viewed patient record maintenance as highly feasible. The development of electronic service devices for contactless medicine delivery was noted as moderately feasible for 26.38% of the sample, while electronic monitoring of medication intake was considered moderately feasible by 37.50% of research participants. Data analytics tools for pharmacy use were regarded to be largely feasible (29.16%), while for interdepartmental collaboration (i.e., medical services in the pharmacy field), 27.77% of the sample rated it feasible to a moderate extent, whereas the creation of a patient care system in direct collaboration with doctors and other health professionals was noted as feasible to a moderate extent (30.55%). Finally, most participants in the survey viewed positively the potential of creating pharmacy networks, with a response rate of 19.44% to a large extent and 27.77% to a very large extent (Graph 14).

Findings of quantitative survey responses

Following decoding, processing, and examination of the main responses from the electronic questionnaires completed by the participants in the quantita-

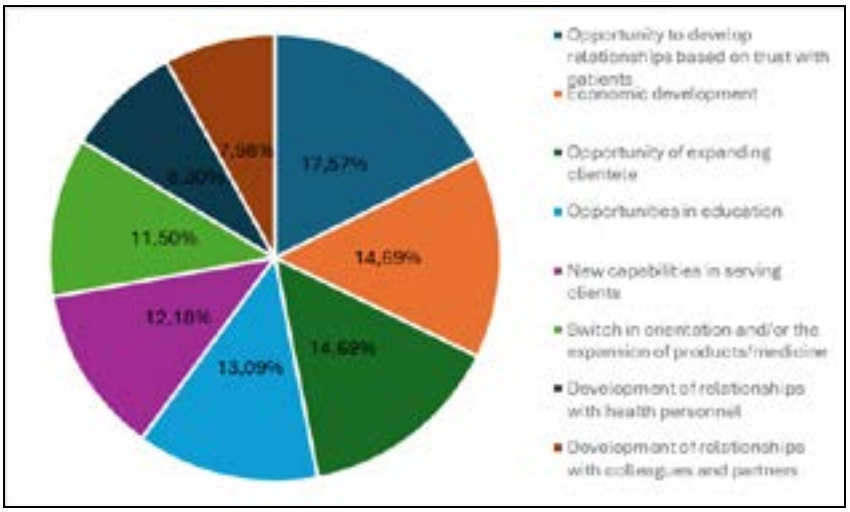


Graph 12. *Repercussions of participation in managing and dealing with the pandemic (23nd question)*

tive research, we conclude to the following findings and comments:

The majority of the sample (83.33%) answered that they either possessed or acquired the necessary knowledge and skills during the pandemic to manage it effectively. This knowledge did lead them to propose mainly four options to patients with a positive COVID-19 diagnostic, which are also the ones that dominate: (i) vitamins and supplements; (ii) OTC medicine; (iii) rest, and (iv) consulting a doctor. The measures that were considered the most effective were personal hygiene, mask use, vaccination and cleaning/ventilating premises, while mobility restrictions were among the measures that seemed to be considered the least effective. It was noted that 2.77% of the research participants considered that vaccination was not a measure that helped sufficiently in the fight against the pandemic. This may not have been anticipated by people in the health sector (even though it was a very small percentage), but it illustrates the diversity of opinion at the time.

The main actions undertaken by pharmacists during the pandemic included active participation (at a rate of approximately 44%) in combating the pandemic, by educating and guiding their local communities, collaborating with healthcare scientists, referring suspected cases to central health systems (taking care to minimise public panic and participating in state-led pandemic management strategies). Additionally, pharmacists en-



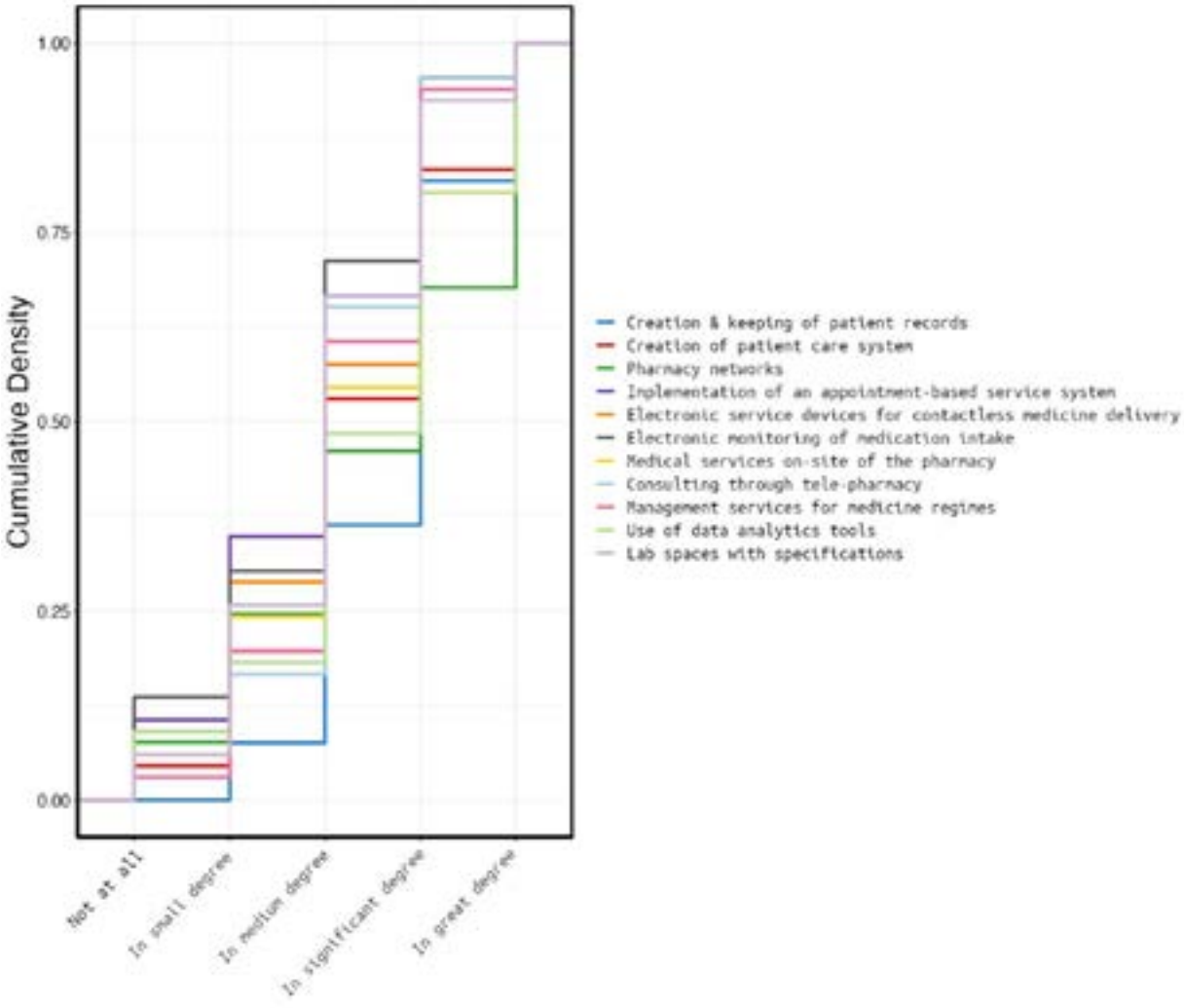
Graph 13. *Repercussions of participation in managing and dealing with the pandemic (24th question)*

sured the supply of medicines and related products (at a rate of approximately 34%).

According to the findings of this study, the pandemic has led to an increased demand for food supplements, OTC medicine, and personal hygiene products. This demonstrates a "shift" of citizens towards personal hygiene and alternative approaches to combat the disease beyond prescription medication to address health concerns. This shift may have been influenced by the fact that there was no specific medicine designed for COVID-19, prompting the public to explore alternative options. Dealing with the pandemic, however, necessitates the availability of a variety of different resources that support operations, aid in the provision of information and services, as well as providing materialised resources. Overall, research participants marked that resource availability was generally satisfactory.

At a general level, most participants rated the government's response time and actions to the pandemic as satisfactory. Among the initiatives considered positive and standing out are the digital prescription and vaccination rollouts, with most research participants considering to a high degree that the government had the appropriate response time. However, response time regarding the use of masks, antiseptics and protection measures for self and personnel it was not so satisfactory, with approximately 25% of the sample marking it with a low degree and around 23% marking it with a moderate degree. Therefore, it was identified from the opinions of the research participants that of all the interventions, decisions and directives of the government, those concerning self-protection measures were moderate and resulted in low satisfaction, while approximately 9% of the respondents, was completely dissatisfied with the response time of all state's measures.

In regard to measures related to the participation of pharmacies (and pharmacies) in the pandemic, research participants agreed or unanimously agreed on the positive contribution and importance in fighting the pandemic. However, two measures, were identified as exceptions. One was related to the use of tele-pharmacy tools and the other to home delivery. Regarding the use of tele-pharmacy tools, about 80% of the sample was either neutral or simply in agreement, while about 20% disagrees. This disagreement may be related to the lack of required infrastructure and systems in all pharmacies across the country, which is required for proper tele-pharmacy usage and evaluation. At-home delivery, respectively, gathered most negative reactions as according to the views of the majority of respondents, "It is not the job for the pharmacy" to deliver medicine outside its premises and/or not all pharmacies can support such a service for operational, economical, employee number, geographical, and other reasons. It is worth noted that the majority of participants be-



Graph 14. *Evaluation of the degree of feasibility of practical applications in pharmacies in Greece (25th question)*

lieved that the application of new practices in pharmacies in Greece could be achievable at a medium level, while most agreed that it would be easier to create and manage patient records.

The vast majority of research participants regarded active participation in pandemic management as very important, with many indicating their role had expanded and been enhanced as a result. Employees in pharmacies found their contribution valuable and their role (and that of their colleagues) crucial in managing the pandemic within their families, communities, the towns, regions and the country in general. Moreover, they viewed their role in relation to their patient as extremely important.

More than 85% of research participants indicated that during the pandemic, workloads increased a lot. This shows that pharmacies, even though theoretically not belonging to the "first line of defence" in the healthcare system and in general are not the first choice for patients, experienced increased activity during the pandemic. This surge had a negative impact on the physical and psychological condition of workers, with approximately 52% and 78% of participants in the sample reporting negative effects in their physical and psychological well-being, respectively. However, respondents viewed the repercussions of their partic-

ipation in managing the pandemic very positively, in regard to the economic factors, the gain of experience, and relationships with patient customers.

Workers in pharmacies detected many opportunities that emerged from the pandemic, with most accruing almost the same percentage, between about 11% and 17%. Those were: (i) opportunities of creating trustful relationships with patients, as a by-product of the pharmacists' active duties that led many of the patients to change their approach and refer firstly to their pharmacist, creating closer relations and relationships based on trust (most recorded answer), and (ii) following with a small difference in percentage, the opportunity of developing the business in cooperation with other colleague pharmacists and with healthcare professionals in other sectors.

3. Discussion

The COVID-19 pandemic highlighted the critical role of pharmacists (and pharmacies) in healthcare and the need for their continuous training and professional development. The current study, based on digitally filled in, structured questionnaires with 25 questions, and on a sample of 72 research participants, yielded the following conclusions:

1) Pharmacists were well-prepared and had the required competencies and the skills to deal with the pandemic effectively. 2) The majority of pharmacists reported that they either possessed or gained the knowledge and the experience required to handle the crisis during the pandemic. 3) The availability of resources and sufficiency of provisions were critical components for the efficient operation of pharmacies. 4) Despite challenges, pharmacists managed to respond to heightened requirements, providing counsel and medicine to patients, however, the provision of medicine and protection material was a field that exhibited difficulties and required better organisation and support by authorities. 5) Pharmacists played an important role in briefing, orientation and education of the public on prevention, protection measures, and vaccination. 6) Their contribution to the provisioning of relevant coronavirus tests, vaccinations as well as advice to patients were important factors in dealing with the pandemic. 7) The increased demand for vitamins, dietary supplements, and OTC medicines underlined the trust of the public in pharmacists and their critical contribution in public health. 8). The experience from the COVID-19 pandemic emphasised the need for strengthening the cooperation between pharmacists and other health professionals, as interconnection and information sharing between various organisations and professions in the health sector proved "vital" for the efficient crisis management. 9) Pharmacists would have to continue to actively participate in healthcare networks and strengthen and upgrade their cooperation with other health professionals to better serve patients in future health crises.

Additionally, 10) The pandemic highlighted the need for improving electronic systems and digital systems within the health sector, as pharmacists with access to modern electronic systems and telemedicine platforms, could more effectively manage their patients' needs. 11). Further development and adoption of new health technologies could enhance the quality and effectiveness of services provided by pharmacies (and pharmacies). 12) The analysis of data showed that the mental and physical health of pharmacists was substantially affected (negatively) during the pandemic, as the increased demand, shortages in resources and everyday pressure during that period, created stress and work fatigue. 13) It is important for support and resources to be provided to pharmacists to help manage stress and work fatigue, and to improve their mental health during periods of health crises like pandemics. 14) Pharmacists (and pharmacies) responded effectively to the challenges of the COVID-19 pandemic, and that experience can serve as a model of good practice to strengthen their role for public health. 15) The incorporation of pharmacists (and pharmacies) in health crisis strategies and the enhancement of their cooperation with health organisations will contribute to better preparedness for future crises. 16) The COVID-19 pandemic underscored the need for continuous education, training, and professional development for pharmacists, who must remain updated, prepared, and equipped with new skills to respond to the evolving demands of healthcare and improve

service quality.

A future study, conducted at a certain distance in time from the COVID-19 pandemic and the return to normality, is considered necessary, in order to gain the updated perspectives on the specific topic.

4. Conclusion

In summary, the research led to the conclusion that the contribution, the role and importance of pharmacists and pharmacies were substantial in managing the COVID-19 pandemic, as they improved public trust in their profession, and supported their cooperation with other health organisations and health professionals. Therefore, the observations and the results of this study could serve as a basis for practices, and even policy recommendations, aimed at improving health services and enhancing the role of pharmacists (and pharmacies) within the public health sector at local and regional level. □

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