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Features of the Advanced Vocational Training of Medical Workers under Modern Conditions

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ABSTRACT

In early March 2020, the WHO declared an outbreak of coronavirus infection as a global pandemic. Due to the rapid pace of spread and high mortality rates, the need for a rapid study of this disease by doctors has increased, as well as enhancing the level of knowledge and compiling an algorithm for counteracting the pandemic. That is why the purpose of this academic paper is to study the features of health workers professional development, which have arisen under the conditions of the pandemic COVID-19. The present academic paper aims to analyze the features and difficulties faced by health workers within the conditions of the pandemic. As a result of the analysis, the author proves that the current epidemic situation in the world has directly affected the undergraduate and postgraduate training of the entire medical community. The study of the features of advanced vocational training has been conducted not only among doctors, but also among medical staff. Characteristic features of improvement of professional development among primary, secondary and tertiary doctors of medical care provision have been analyzed. Also, the influence of modern conditions on professional development of nurses and paramedics, students, graduates of higher medical institutions has been traced. The influence of stress, tension and psycho-emotional burnout of medical workers under the conditions of the pandemic has been revealed. The analysis of the issue of this academic paper has included not only studying features of advanced vocational training of domestic medical workers, but also, health care workers of the USA, Europe, Asia.

Keywords: Advanced Vocational Training, Pandemic, Training, COVID-19, Practical Activity.

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INTRODUCTION

The Sars-CoV-2 coronavirus pandemic became known at the end of last year, the first outbreaks of which were reported in Wuhan province (China). This emergency situation in health care sphere has caused international concern due to its rapid spread in numerous countries around the world. Health care workers, being in the group of high risk of infection, became the first on the line of defense with the disease. Insufficient provision of personal protective equipment, dangerous conditions not only for the implementation of professional activities, but also for life, have caused high mortality among medical staff. According to the data of International Council of Nurses (ICN), which includes representatives from about 130 countries, as of April 15, 2020, coronavirus disease has killed more than 90 thousand health care workers. In many countries, primary care physicians were the first to face the effects and consequences of a pandemic without clear algorithms for providing medical care. Due to the large number of patients, high mortality rates, hospitals' overcrowding, many medical specialties have been reoriented. Hospital-based physicians connected and collaborated "first hand" with Chinese doctors online in order adopt the best practices concerning diagnostics and treatment of coronavirus.

During the pandemic, health care workers have faced numerous problems, including:

– insufficient provision of personal protective equipment;
– insufficient amount of test systems for diagnosing coronavirus infection.
– high levels of coronavirus infection, resulting in a large number of patients;
– lack of clear algorithms for diagnostic and treatment;
– excessive workload of patients per doctor;
– insufficient provision of artificial lung ventilation apparatus in resuscitation and intensive care units.
– physical fatigue, mental exhaustion, depression among health professionals;
– infection contamination off physicians with COVID - 19;
– mortality among health care workers.

An unexpected outbreak of coronavirus infection has also changed the education of medical students, interns, hospital physicians, medical trainees. Forasmuch as the number of patients increased sharply in early 2020, the heads of medical educational establishments were faced with the question of abrupt changes in the educational process. Such changes have had a significant negative impact on the training of future doctors, nurses, paramedics. Lack of clinical practice activities, work with the patient, physical methods of examination of the patient (palpation, percussion, auscultation) has undermined the success of vocational training. Lack of experience in directions of narrow medical specialties, inability to practice medical manipulations has worsened the educational process. Unresolved employment prospects, the impossibility of international internships for medical graduates has significantly affected the self-

implementation of young professionals. High levels of stress, a large number of materials for learning, provided through online resources, have had a negative impact on the vision, nervous and endocrine systems of students. Conducting conferences, medical conventions and convocations among doctors were postponed and suspended over time.

This scientific article traces in detail the difficulties and recent changes that have influenced the education of medical workers on the example of many European countries, including Ukraine, as well as the UK, the USA, Asian countries (China, South Korea). The author has revealed the devastating impact of COVID-19 on all aspects of medical vocational training based on the study of the latest data presented in the discussion of numerous medical communities.

LITERATURE REVIEW

The study of the scientific literature on the impact of COVID-19 on the training, professional development and activities of health care professionals can be traced in numerous countries; it applies to almost all areas of medicine. The negative effects of the pandemic on medicine reflect the concerns of many scientists on this issue. According to a survey conducted by Federation of Trainees of European Orthopedists and Trauma Trainees (FORTE), which includes representatives from more than 23 European countries, there is a significant impact of the epidemiological situation. Most of them believe that the reduction of clinical, surgical and educational work will negatively affect learning. However, it has been emphasized that the option of distance learning, as a compensation for the absence of the latter, may be relevant in the future [12].

At the same time, professors of emergency medicine at the Rutgers School of Medicine, believe that the problems that arose during the COVID-19 outbreak were not similar to those connected with the Ebola virus in 2014. Murano has noted: "COVID had a completely different scenario. We have quickly realized that we have a shortage of personal protective equipment, as well as a lack of testing systems, tracking the potential effects of the virus". In countries with a high level of morbidity, the training of students, doctors - interns has been changed over to distance learning. Lack of practical activities, work with patients has negatively affected the level of training of future doctors. In Ukraine, starting from March 2020, advanced training course, internships and specializations of doctors in educational institutions began to be canceled. Subsequently, these activities were reorganized into distance learning. In the United States, ACGME Higher Medical School accreditation courses have been suspended. Attending of accreditation centers, review of clinical cases, training, survey of residents, lectures of educators have been postponed. According to data of University world news, the closure of higher educational medical establishments in China has taken place in early February this year. During February and March 2020, universities in Thailand, South Korea, and Vietnam have also been transferred to distance learning mode [4].

According to data of M.P. Rimmer (Journal of General Ostetrics, the UK), within the conditions of doctors' shortage and pandemic crisis, junior obstetricians - gynecologists were involved to provide adequate medical care for pregnant women. Such decision was necessary to prevent maternal and infant mortality, as well as for the well-being of pregnant women [17].

The Royal College of Surgeons of England has published a guide for trainees, which sets out four basic priorities. These guidelines have been published to guide the work of young physicians who have previously had to join clinical work. They are as follows: providing emergency care, protection of surgical personnel, performing alternative surgical and non-surgical tasks.

As it has been noted by Hodin, R.A. & Pawlik, T.M. (Department of Surgery, Ohio State University, Wexner Medical Center, Columbus, the USA), the impact of the pandemic on scientific advances, training and clinical trials in surgical oncology is very significant. Despite funding programs, aimed to compensate hospital losses from COVID-19, the financial losses are huge; they are threatening to disrupt the academic mission [7].

In Ukraine, in accordance with the order of the Ministry of Health of Ukraine № 1106 as of 02.06.2020 attestation for the title of "doctor – specialist", the assignment / confirmation of the qualification category has been postponed in connection with the prevention of the spread of coronavirus disease. In addition, the restriction on the share of distance learning in the annual mandatory minimum of continuing professional development for 2020 have been canceled [13, 14].

That is, doctors can use online resources for professional self-improvement and self-development. Validity of certificates of qualification category and other certificates, the term of which expires current year, has been extended by 1 calendar year. According to this order, doctors who are directly fighting the eradication of the pandemic and must be certified in 2020, 50 points are awarded automatically.

MATERIALS AND METHODS OF THE RESEARCH

During conducting the research, the method of survey, testing, analysis, study and generalization of the obtained data has been used on the example of online survey of members of Federation of Trainees of European Orthopedists and Trauma Trainees in Europe (FORTE) in order to process the available statistical data. The indicators, presented by Springer link, International Orthopedic, have been analyzed in this academic paper. Under the unforeseen circumstances of the pandemic, orthopedic practice could not remain unchanged. Non-urgent consultations and numerous surgical procedures have been canceled or postponed. Planned surgery in many facilities has been temporarily suspended, and the total number of orthopedic cases has fallen sharply in order to minimize the spread of the virus and to reserve and redistribute resources in medical staff (nurses, anesthesiologists), medical equipment (personal protective equipment, ventilators) and beds. In Europe, a sharp reduction in endoprosthesis and arthroscopy procedures has been documented, and the incidence of injuries has decreased during the COVID-19 period due to the "stay at home" policy. This health care crisis has had significant consequences not only for patients and surgeons, but also for orthopedists. It is easy to assume that limited clinical and surgical exposure, temporary cessation of hospital training activities and the cancellation of most scientific meetings can significantly affect orthopedic training. Some authors have singled out this issue in other surgical specialties. However, as far as we know, the real consequences of the crisis for orthopedic education in Europe are largely unknown.

This study assesses the impact of the COVID-19 pandemic on orthopedic training by conducting an online survey of members of Federation of Trainees of European

Orthopedists and Trauma Trainees in Europe (FORTE). This European society includes orthopedists and young orthopedic surgeons who have been studying [12].

RESULTS OF THE RESEARCH

The survey was conducted among members of Federation of Trainees of European Orthopedists and Trauma Trainees of Europe (FORTE).) It consisted of 24 questions (one answer, many answers, on the Likert scale. Demographic data of orthopedic students (six questions), changes in clinical role (four questions), institutional changes due to the COVID-19 pandemic (nine questions) and personal considerations (five questions) have been studied [12].

The approval of the ethics committee was deemed unnecessary for this study because the survey was anonymous and the personal data of the patient or respondent were not included. Data were collected using SurveyMonkey. The survey consisted of 24 questions by applying scales with one, several answers and the Likert scale. Six questions documented demographic features. Changes in the role of doctors in response to COVID-19 were addressed in four questions. Institutional changes and its impact on participants' daily practices and training were assessed in nine questions, while personal opinions and considerations were outlined in five questions. The country of practice was recorded in the demographic section of the survey, and the multiple-choice matrix examined the type of institution in which the participants worked, their specific role and the year of postgraduate training. Reorientation of orthopedic doctors to COVID-19 units was recorded. Items for studying any preventive measures applied were included, such as virus testing for doctors and special training of COVID-19. Release from work for self-isolation or illness was also documented. Institutional changes that affected daily practice or training, including patients' care, diagnostic examinations, and surgical procedures, were investigated. Delays in retraining, scholarship payments and regular meetings of educational departments were also studied. In addition, orthopedic doctors were asked to describe their understanding of the importance of different learning approaches. These included lectures, orthopedic courses, work in the pathology and anatomy laboratory, scientific meetings, e-learning and virtual reality learning. They were also asked to anticipate possible future changes, taking into account learning opportunities [12].

A link to the survey was emailed to FORTE members on May 28, 2020, and a reminder was also sent every other day to improve the response rate. Participants were invited to take the survey within 15 days, and it was finally closed on June 11, 2020. All data, collected from the online database, were calculated as frequencies and percentages. 327 orthopedists and traumatologists from 23 European countries took part in this survey. Of the interviewed participants, 79,5% were men and 20,5% were women. Most of them were between 30 and 35 years old (49,0%), and 26,3% were younger and 24,7% older than age group specified. Of all the participants, 45,3% worked in university hospitals, 44,7% - in non-university public hospitals and only a minority - in private institutions [4]. Most of them were residents (70,3%) in different years of study. Postgraduate trainees / scholarship holders accounted for 23,9% (Table 1).

Table 1. Level of training of participants

Level of training	Participant (%)
Freshman	12,2
First year student	7,0
Second year student	10,1
Third year student	10,4
Fifth year resident	10,1
Last year's resident	20,5
Trainee / scholarship holder	23,9
Others (graduate student, researcher)	5,8

Source: Complied by the author

Of those who were studying, 59,8% retained their clinical role in the orthopedic department, however, 20,9% were reoriented to non-orthopedic units of COVID-19 (Table 2) Concerning the issue of health condition at workplace, most of them were not tested for coronavirus infection at their facilities (65,9%). Of those tested (34,1%), a positive result was reported by 2,2%. Of all the participants, 47,1% did not leave their responsibilities for self-isolation or infection. The rest reported about one (11,1%), two (17,2%), three (13,1%) and even more weeks (11,9%) of unjustified absence for the following reasons. For most orthopedists (60,3%) no special training was conducted concerning COVID-19 [12].

Table 2. Change in the clinical work of participants due to COVID-19

Have you worked, are you working, will you work in the COVID-19 unit (department) with patients infected with COVID-19?	Participants (%)
Yes, I was / am / will be appointed for the treatment of non-core patients in the COVID-19 unit (department).	20,9
Yes, I was / am / will work in the COVID-19 department for the treatment of orthopedic patients.	7,8
Yes, I was assigned / am assigned / will be assigned to work in a non-core department, but I do not work in the COVID-19 unit (department).	3,3
Yes, I was assigned / am assigned / will be assigned to work for the treatment of orthopedic patients, but I do not work in the COVID-19 unit (department).	8,2
No, I continued my current clinical role / did not work consciously with patients infected with COVID-19.	59,8

Source: Complied by the author

During the pandemic, institutions of respondents (57,1%) allowed only important patients' visits and emergency surgical procedures (due to fractures, infections, cancer), while 36,0% underwent drastic changes. Doctors' activities, outpatient management and participation in surgical operations have had disastrous consequences. Various answers were collected regarding the research activities [10]. Some participants found that it was reduced (36,1%), others indicated it was increased (27,1%), and others specified that it was not changed (26,6%). Approximately 56,6% of participants also reported about decrease in study responsibilities (Figure 1). Regarding remote work from home, 38,9% said it was inconvenient, and 14,8% said it was dangerous for their relatives, family. Most participants agreed that this was only required for e-learning or virtual learning (41,8%), while others stated that it could only apply to research activities (28,3%). However, 16,4% stated that remote work is an option for providing medical care through telemedicine [12].

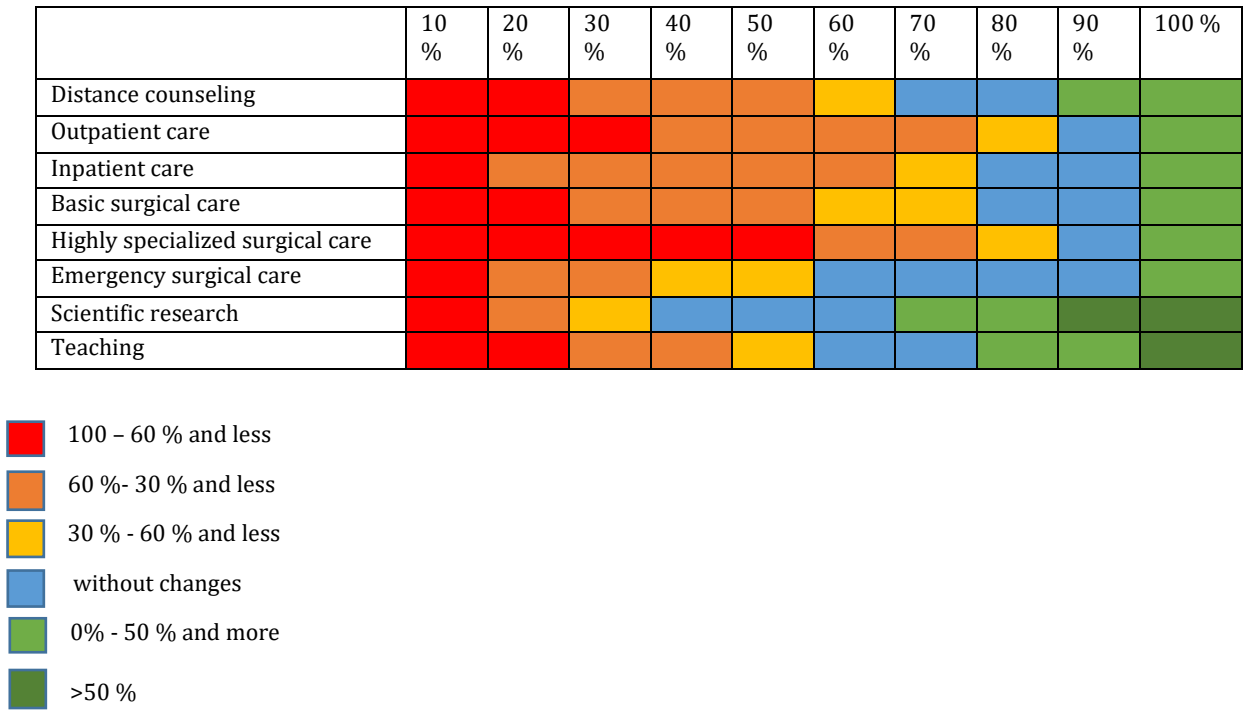

Figure 1. Changes in the activities of participants during COVID-19 pandemic compared to the previous period
Source: Complied by the author

Teacher-led education was limited in most cases (52,1%) during the COVID-19 period. Surgical education, namely preoperative planning, execution of operations and postoperative care, were significantly impaired, 49,2%, 58,6% and 46,7% of the surveyed participants, respectively [8]. The time for training at the patient's bedside was also reduced (56,0%), but the volume of distance learning increased (55,3%) (Figure 2) [12].

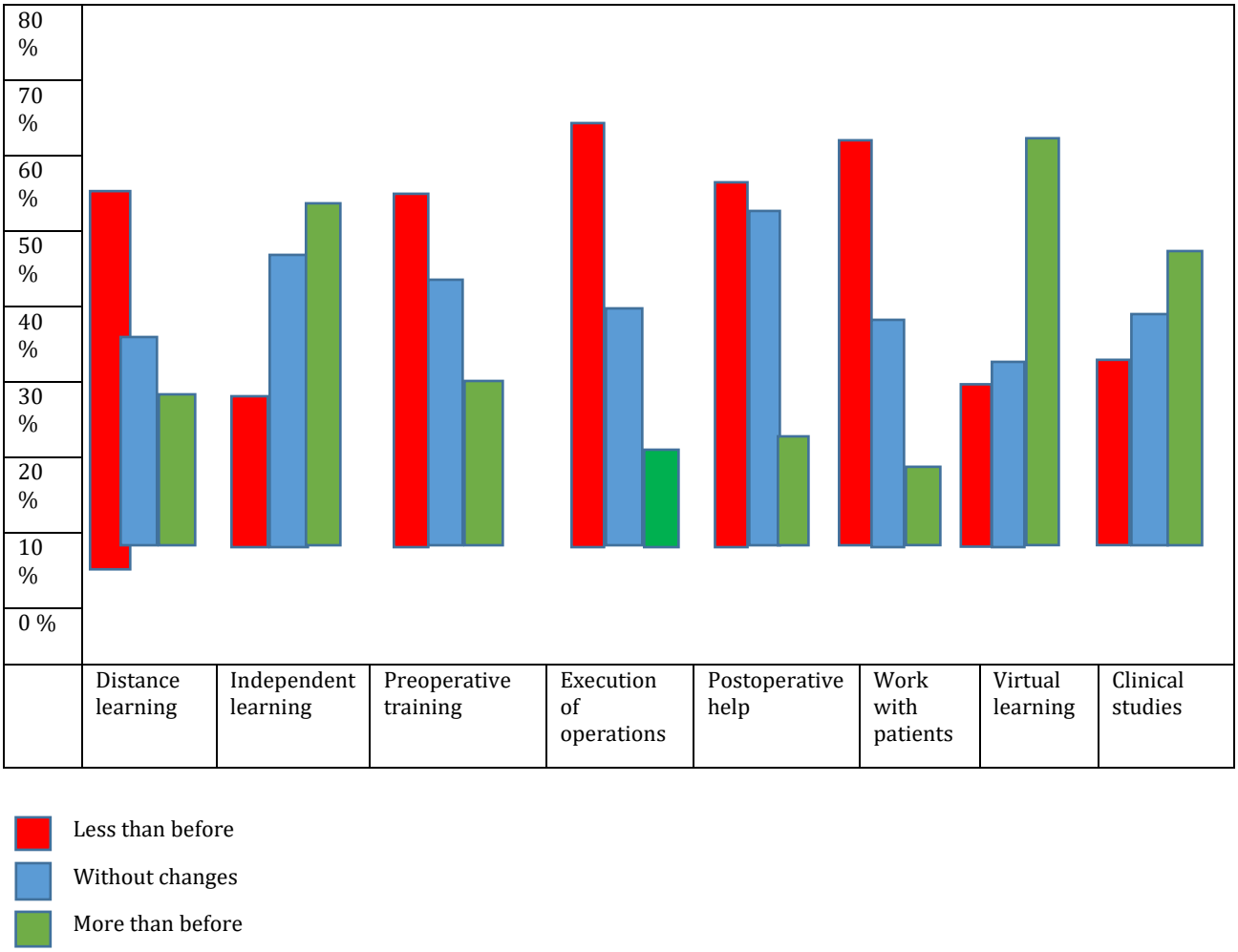

Figure 2. Changes in the training of participants during the pandemic COVID-19 compared to the previous period
Source: Complied by the author

The majority (56,6%) of respondents stated that all national and international scholarships had been suspended, while 23,0% reported that only international scholarships had been suspended. Regular meetings of the orthopedic department were conducted with caution for 34,8% of respondents. Only selected participants (for example, on call) were allowed to participate (27,1%) in the meeting, while 19,3% stated that they were conducted exclusively online via video conference.

Significant concerns about the achievement of the annual learning goals were expressed by 58,2% of participants, while 18,4% of them stated that it would be clearly impossible. Of all the respondents, 45,5% believe that they will not acquire the expected practical skills, 45,1% will not fill in their registration log and 15,6% state that their final exams will be postponed. A quarter of respondents feared losing a trimester, semester or even a year of study, believing that an additional year of study was needed. However, the majority (61,1%) believe that they will complete their rotation as planned.

According to a scale from 1 to 5 (1 = not important, 5 = very important), participants described their ideas about the importance of different educational approaches. Education-oriented trip was considered the most important approach (average score 4,3); laboratory courses were the next in the list (4,2) and then there were trips to orthopedic courses (4,1). Major training programs scored 4,0 points, international and national meetings – 3,9 points, and web platforms – 3,8 points. The lowest score was given to the big rounds (3,5). Assessing the importance of educational approaches in the future compared to the current ones, higher assessments of e-learning opportunities were revealed; virtual reality surgical simulators (4,2 versus 3,7), web-based video platforms (4,2 versus 3,8), e-learning (4,1 versus 3,7) and podcasts / webinars (4,1 versus 3,6), emphasizing their importance [13].

Overall, 54,5% of respondents said that the COVID-19 crisis will negatively affect orthopedic training, while 21,3% stated that there are many opportunities to achieve better education. Finally, the majority of participants (75,4%) believed that telemedicine care would become more relevant in the future due to the COVID-19 pandemic.

The impact of the pandemic on the training of orthopedists and traumatologists had several components. Firstly, a significant proportion of respondents were reoriented to non-core sectors, spending their time on non-orthopedic or even non-medical activities. Secondly, the overall reduction in orthopedic clinical and surgical volume implies that training had to be forcibly interrupted, changed, or continued. Thirdly, education had to be radically developed by implementing and incorporating modern teaching methods such as e-learning, webinars and virtual simulators [25].

In the present survey, most participants stated that they did not work with patients infected with COVID-19. However, 20,9% of respondents were relocated and were responsible for non-orthopedic patients in COVID-19 wards for a certain period of time, and a few ones (3,3%) were even assigned to non-orthopedic patients who were not in COVID-19 wards. Similar findings were reported during a survey of young endoprosthetics surgeons; of all the respondents, 75% continued their work as orthopedic surgeons, while 7% were reoriented to the intensive care unit for patients infected with COVID-19, and another 18% were directed to the emergency department / non-intensive care unit.

Other specialization and reorientation may meet urgent service needs, however in such situations curricula are disrupted, creating future problems with curriculum requirements [15, 19, 24]. Reorientation, combined with the risk of infection, can lead to a very alarming situation. According to the survey, 60,3% of participants did not receive special training concerning COVID-19, and 65,9% did not pass testing on COVID-19. Fighting at the forefront of coronavirus infection, sometimes with limited access to personal protective equipment, is life-threatening for clinicians. This risk may be further increased when reorienting and working outside the clinician's special area, where errors are likely to occur due to lack of competence. Limiting the influence of participants, protecting them and preventing their discomfort due to this psychological burden should be extremely important [9].

DISCUSSION

Based on the study conducted, it has been established that the impact of a crisis situation - an outbreak of COVID-19 in most aspects negatively affects the professional training or retraining of medical workers. On the example of the above mentioned study, a negative impact on the training of doctors can be traced, forasmuch as clinical and, most importantly, surgical practice are the most significant vectors for the development of orthopedic skills. In connection with this, we were able to compare the findings mainly with studies of other specialties. The majority of participants (84,5%) in the study, examining the training of gastroenterologists, reported that the outbreak of COVID-19 significantly affected their training. The crisis has led to a significant gap in education due to the reorientation of doctors and reduced activity according to their specialty. In a similar study of neurosurgical training, the authors also reported about reduction in the volume and that many outpatient visits were converted to telemedicine format [24].

There is no doubt that education should take new paths. However, in what direction should it move? The future perspective of traditional teaching methods was preserved only for the practical components of training [6, 9, 19]. By the way, it should be noted that online training receives a high level of assessment, with the application of surgical simulators of virtual reality, web platforms for video, webinars, thus emphasizing the need for their further development. The vast majority of our participants (75,4%) believed that the COVID-19 pandemic would make telemedicine care more relevant in the future, despite the fact that online medicine during the pandemic was quite limited [12].

This investigation has several limitations inherent in all survey-based researches. Firstly, respondents came from different countries that support different pandemic strategies and are experiencing a pandemic at different levels of severity. Secondly, it is possible that new educational interventions, used in the centers, are not recorded here. Thirdly, many questions were designed as multiple-choice questions to simplify the answer.

Forasmuch as this strategy may miss some nuances of open responses, free text areas have been included to capture any additional details of the response. However, the present sample consisted of orthopedists and students from almost all European countries, which makes it a fairly representative group of surveys that can accurately depict the current state of orthopedic education in Europe [12, 15].

CONCLUSION

It is obvious that the Sars-CoV-2 pandemic has significantly affected the training, retraining of health workers. During the crisis, a significant number of health care workers were reoriented to other departments to provide non-core care. Graduates of medical institutions, under the conditions of a lack of sufficient number of workers, received a challenge to their knowledge and skills. Medical education has undergone major changes. Under such circumstances, education should adapt and develop, and it should continue to do in such way. In the process, such changes leave behind traditional teaching methods and introduce modern methods such as e-learning, web platforms for video, webinars, virtual reality training and practical simulators.

All efforts should be directed to this optimistic concept in order to reduce the manifestations of the negative impact of the crisis; the latest technologies can be used to facilitate this direction. Medical education and science should be continued to be developed and not intimidated by the crisis. It is the doctor's responsibility to provide medical information and knowledge, regardless of the victim.

Based on the study conducted, a number of unique advantages over the traditional format of personal learning can be traced. However, certain benefits of distance learning, which have been underestimated prior the outbreak of the pandemic, are currently being assessed.

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