



# Practical experience as a determining factor of preparedness of medical and nursing students in Romania during COVID-19 pandemic

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## Abstract

**Introduction.** In the context of the Coronavirus Disease (COVID-19) pandemic, the extent of the damage in the worldwide population and health systems forced governments to find rapid and efficient countermeasures. Thus, global efforts are made to combat this disease and among the identified possible solutions to enforce the frontline workforce is to allow medical and nursing students to help in medical care. This survey proposes to assess the Romanian students' self-perceived preparedness, considering their theoretical and practical knowledge.

**Methods.** The survey was based on an 11-item form which aimed to evaluate the preparedness of the students to efficiently protect against the COVID-19 infection in a hospital setting, the overall willingness of the students to volunteer and the possible barriers that might prevent their involvement. For this purpose, a total number of 1021 responders, from which 18% nursing students and 82% medical students, from public and private medical schools of Romania, were included. Data processing was made using a free trial of GraphPad PRISM 8.0. The calculated parameters were: mean value, standard deviation, and confidence intervals (CI) and the level of significance was  $P < 0.05$ .

**Results.** Based on the collected data, we evidenced that the majority of the respondents (93%) acknowledged practical skills as a main positive factor for the decision to join the healthcare frontline. A strong, positive correlation between the self-perceived practical skills level, preparedness and the willingness to voluntarily involve in medical assistance was found.

**Conclusion.** A significantly high level of practical skills and preparedness level in self-protecting effectively against COVID-19 was mainly seen in the following subgroups: the nursing students and the students that had previously been part of organized medical volunteer structures, revealing the practical experience to be a determining factor of preparedness.

**Keywords:** COVID-19, pandemic, medical students, nursing students

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## Introduction

The World Health Organization (WHO) officially declared Coronavirus Disease 2019 (COVID-19) a pandemic in early March 2020. The last great pandemic, the Spanish flu, in the UK, led to the recruitment of final year medical students as auxiliary health personnel, in

the efforts to combat the disease and to substitute the lack of medical personnel [1,2]. Recent viewpoints suggested that the bold decision to enhance the capacity of the frontline workforce, by voluntarily involving medical students, could have an important impact, and would be justified on health and economic levels

[3]. Governments throughout the world are fast tracking final year students to graduate earlier in order to help the health systems [3-6]. Romanian government has issued an order by which medical students, starting with the 4<sup>th</sup> year, are allowed to volunteer in the emergency departments. But several questions arise: i) Are they prepared? ii) How realistic is their self-perception concerning the real knowledge/skills they really have, and iii) Which is the impact of voluntary actions in the development of practical skills.

In this regard, a cross-sectional survey-based study has emerged, evaluating the Romanian students' perspective of preparedness in joining this fight and whether practical skills could be a determining factor in the decision of according medical assistance.

## Methods

A report based on an 11-item open survey and subsequently distributed via social media channels, among medical and nursing students of the 12 Medical Faculties of Romania was developed. The survey response rate was not possible to be calculated, because of the impossibility to identify precisely the number of people which had access to the form. For the questionnaire form elaboration a 4-point Likert scale was used in order to evaluate self-perception of medical students concerning their theoretical and practical knowledge to fight against a highly-contagious disease and to what extent the responders consider being prepared to effectively protect against COVID-19 infection in the case they will be recruited to help on a voluntary base.

The survey was voluntary and anonymous, not being pre-tested. The data were collected between April 13, 2020 and April 16, 2020. During that period, in Romania, the rate of new COVID-19 confirmed cases was 350 per day. In that time period the number of deaths recorded was 61, according to official statistics [7]. Multiple choice and open answer questions were used to investigate the willingness and the barriers to participate voluntarily in medical assistance.

The inclusion criteria was the undergraduate students of all medical universities of Romania, including both public and private.

The total number of participants in this study was 1021: 805 female (78.4%) and 221 male (21.5%). The distribution among these participants was a balanced one, confirming the results representation. Thus, from Medical Schools there were 338 respondents in the preclinical years of study (1-3) and 500 in the clinical years (4-6). The rest of 183 were from nursing schools.

For the survey data processing a free trial of GraphPad PRISM 8.0., was used. The calculated parameters were: mean value, standard deviation, and

confidence intervals (CI) and the level of significance was  $P < .05$ .

Apart from these values, Pearson correlation was estimated to confirm the existence of a relationship among some of the analyzed elements. A positive correlation means that connected variables follow the same tendency (increase or decrease) while a negative one means their opposite tendency.

## Results

A total number of 1021 participants were included in the study. One responder was excluded from further analysis for completing a non-compatible year of study and faculty.

The inclusion criterion was to be an undergraduate student of a medical university in Romania, either public or private. A number of 184 (18%) nursing students and 838 (82%) medical students' answers were registered.

Based on the provided answers, it was noticed that the overall willingness of respondents to offer medical assistance in the hospital was 53.6%, from which 5.57% were already volunteering. There was no statistical difference between the nursing and medical students. Of the total participants, 93% acknowledged that the lack of practical skills of personal protection against infections, with high contagiousness, highly influence the decision to involve students.

From the acquired data it was observed that the self-perception concerning the preparation levels among different considered groups slightly differed. Thus, the nursing students seem to have a mean theoretical (2.81 CI95:2.7-2.92 vs. 2.52 CI95:2.47-2.57,  $P < 0.001$ ), practical (2.54 CI95:2.43-2.65 vs 2.20 CI95:2.14-2.26,  $P < 0.001$ ) and preparedness level significantly higher (2.73 CI95:2.62-2.84 vs. 2.45 CI95:2.39-2.51,  $P < 0.001$ ) as compared with medical students (Tables I-a, I-b).

The subgroup of students that were part of organized medical volunteer structures, compared to the subgroup that were not, showed a significantly higher level of practical skills (3.01 CI95:2.91-3.11 vs 2.06 CI95:2.01-2.11,  $P < 0.001$ ) and preparedness level in self-protecting effectively against COVID-19 (3.06 CI95:2.96-3.16 vs 2.35 CI95: 2.29-2.41;  $P < 0.001$ ); also the willingness to join the frontline workforce was higher in the first group. (66.98% vs 49.93%). The Pearson correlation revealed a strong correlation between the self-perceived practical skills and preparedness level (Pearson  $r$  value=0.57;  $R$  squared=0.325;  $P < 0.0001$ ).

The willingness to get involved voluntarily in medical assistance was correlated with a higher reported level of practical skills and an increased level of preparedness (Table II).

**Table I-a.** Means of reported skills level and preparedness to efficiently protect against COVID-19 infection, according to the year of study for medical students.

Year of study	Total number	Gender	Mean Value of reported practical skills	Confidence Interval 95%	Mean Value of reported preparedness	Confidence Interval 95%
1	65	52 females 13 males	2.35	2.13-2.57	2.55	2.35-2.75
2	120	90 females 30 males	2.20	2.04-2.36	2.46	2.31-2.61
3	153	35 females 118 males	2.29	2.16-2.42	2.49	2.36-2.62
4	320	238 females 82 males	2.10	2.01-2.19	2.35	2.26-2.44
5	81	66 females 15 males	2.20	1.99-2.41	2.53	2.33-2.73
6	99	75 females 24 males	2.31	2.13-2.49	2.59	2.41-2.77

**Table I-b.** Means of reported skills level and preparedness to efficiently protect against COVID-19 infection, according to the year of study for nursing students

Year of study	Total number	Gender	Mean Value of reported practical skills	Confidence Interval 95%	Mean Value of reported preparedness	Confidence Interval 95%
1	10	6 females 4 males	3.4	3.08-3.72	3.3	2.83-3.71
2	69	59 females 9 males	2.69	2.52-2.86	2.94	2.78-3.1
3	65	61 females 3 males	2.43	2.25-2.61	2.58	2.38-2.78
4	39	36 females 3 males	2.25	2.06-2.44	2.46	2.24-2.68

**Table II.** The percentage of students willing to participate voluntarily in the frontline fighting COVID-19, according to the reported level of practical skills and of preparedness.

Reported level on the 4-point Likert scale	1	2	3	4
Willingness to give medical aid, according to reported level of practical skills	35.8%	48.3%	62.5%	86.9%
Willingness to give medical aid, according to reported level of preparedness	15.9%	42.5%	67.5%	77.8%

The subgroup of participants that were willing to volunteer had a higher preparedness level compared to the other students that hadn't. (2.79 CI95:2.73-2.85 vs 2.17 CI95:2.09-2.25, ( $P<0.001$ )).

The main concerns for which students that were questioned would not get involved as volunteers in hospitals in the context of the pandemic with COVID-19 are: the fear of infecting the people with whom they live (65%) and the lack of personal protective equipment (PPE) (64.3%). Also, the students think they don't have enough theoretical (30.9%) and practical (52.1%) knowledge for self-protection. Furthermore, 25.5% of the students don't want to get involved because of the risk of personal infection.

## Discussion

The results of the present study revealed a higher self-perceived theoretical and practical knowledge, and also a significantly higher preparedness level in nursing

students as compared with medical students ( $P<0.001$ ). We might consider a possible explanation for this result, a more practical approach of the nursing students' academic curricula. Therefore, the clinical experience of a nursing student begins in the first year of study, while the clinical experience of a medical student start in the third year of study.

From the obtained results, we might state that participating in organized medical structures for volunteering have an impact on student's assimilation of clinical skills and therefore, in building their confidence and preparedness to help in uncommon health situations. In Romania, as this kind of structures exist in the emergency field (County Ambulance Services and Mobile Emergency Service for Resuscitation and Extrication - SMURD) an impressive number of students have the opportunity to gain practical experience starting from the preclinical years. There is a high demand every year for joining these

task forces, but the limited number of volunteers lead to a thorough selection. It was previously demonstrated that early experience helps medical students develop appropriate attitudes towards their practice, professional responsibilities, healthcare systems, and health needs of the population [8]. These structures promote the care service in times of crisis as a meaningful value, the sampled willingness to join the frontline workforce was higher in this existing volunteer's group as compared with the students who are not involved in these types of activities (66.98% vs 49.93%).

Nevertheless, despite the previous statistics, a very high percentage of the students which were not volunteer in these emergency services are now involved in the fight against COVID-19. The percentage of these new categories in the total number of the nowadays involved students is 75.5%, while only 24.5% of those who have previously been part of these institutions are now working in the frontline. This result allows us to foresee that the willingness in terms of involving in volunteer acts among emergency units is very high among students, therefore a need for more organizations to be formed in this regard is brought to light, given the current limited number of participants in specific frameworks, mainly due to infrastructural restraints.

Another interesting observation by the analysis of subgroups formed according to the year of study revealed a supra-evaluation in the first stages of education and a slightly different pattern of self-perceived knowledge and preparedness. In the medical students group, the lowest rate of both self assessed knowledge and preparedness was seen in the middle of the faculty, possibly due to the transition from the preclinical to the clinical setup (Table I.a). In the nursing students group, there was a decreasing pattern in apparent discordance to the year of study (Table I.b). By acquiring more medical information and experience, the students, paradoxically at the first sight, might feel more insecure, but it might be the cognitive bias of people with low ability to overestimate their competence. This effect was previously reported in the literature many years ago and it is known under the name of Dunning-Kruger effect [9]. According to individual perception of self-perceived knowledge and preparedness level, their willingness to involve in the medical act respected partly the previous pattern, final year students having the lowest rate in the nursing students group, while in the medical students group, the willingness decreased progressively until the third year of study, but in the following years the willingness progressively increasing, up to the point where the final year medical students expressed the highest will. We must be cautious in comparing the preparedness level of nursing and medical students, due to the differences in the number of students in each group.

Another conclusion concerning the respondent students of the Nursing Faculties emphasized an overall preparedness level greater than the medical students' level,

which could possibly be correlated with a curriculum more centered on gaining practical skills. The proportion of theoretical courses and practical lessons between the two specializations is similar, but the number of academic hours per week is significantly higher for the nursing students. Also, the nursing students have to do mandatory shifts in the hospitals starting from the second year, with a total of minimum 200 hours per year, while medical students do not. The mandatory summer clinical practice for nursing students is almost two times longer than for medical students. For medical students, the first 3 years of university are preclinical, while nursing students start the clinical subjects in the second year [10].

A recent point of view regarding the possibility of medical students to serve in clinical roles has acknowledged the benefits to the patients, to the health care system and also to volunteers, by reinforcing important principles, such as altruism and solidarity, thus supporting the need for a medical volunteering context to be created. This point of view is supported by the results obtained in a study, which brought up the human qualities like solidarity and altruism of students which positively responded to the medical system's needs despite their beginner level of practical skills (no previous involvement in health volunteering) and despite them being conscious about the existing danger.

One of the sampled reasons for students not to get involved as volunteers to provide medical care in hospitals was the lack of Personal Protective Equipment (PPEs) (64.3%). Despite this important concern, an impressive proportion of students from this study (53.6%) would take part in medical assistance if asked for help. Previous data showed a clear correlation between the PPEs availability and an increased willingness of students to help in this kind of situation, therefore we would expect a higher number of students to intend joining the frontline workforce if provided with PPE and training beforehand [11].

The initiative to assess the students' perspective of preparedness in joining the COVID-19 fight and whether the acquired practical skills could be a determining factor in their decision to help medical professionals in the hospital was well received, with a number of 1021 students completing the survey in just 4 days. After stratifying the feedback and comments students gave, there were a few recurrent ideas to be discussed and, possibly, further evaluated.

Understandably, the lack of PPEs provided to medical professionals, the lack of special training given before volunteering in the hospitals or insufficient practical skills acquired during university classes were amongst the most commonly blamed reasons for some student's reluctance to get involved. An interesting point of view was that one of the students from the terminal university years, who considered the thesis and residency exams a priority, compared to the COVID-19 situation, and would not risk their own health or sacrifice their time in order to volunteer

at the hospitals.

However, solutions to these problems or possible alternatives for students to help were provided by students themselves. Some solutions focus on everyone's ability of self-learning or on the possibility to help by participating in other activities such as grocery shopping for the elderly, assembling visitors or responding to messages or calls of the general population, with accurate medical information.

In our study of 1021 students, it is possible that the students who had greater preparedness level were more likely to complete the survey, influencing the generalization potential of our results with the potential of non-responder bias. This may represent the main limitation of our study.

### Conclusions

The aim of this survey was to determine whether medical students' previous practical experience and therefore the prevention skills gained, besides the theoretical knowledge, might be a determining factor of the medical students' feeling of preparedness to voluntarily join the healthcare workforce fighting against COVID-19. The statistical analysis between the practical skills, preparedness level and the decision to get involved voluntarily in giving medical assistance revealed a strong correlation between these parameters. Therefore, practical experience and skills are determining factors of preparedness. The majority of the respondents have acknowledged that the practical skills are a main positive factor for one's decision.

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