

How the Italian nursing student deal the pandemic COVID-19 condition

Elsa Vitale¹, Biagio Moretti², Angela Notarnicola², Ilaria Covelli²

¹Department of Mental Health, Local Healthcare Company, Bari, Italy; ²Orthopaedic and Trauma Unit, Department of Basic Medical Sciences, Neuroscience and Sense Organs, School of Medicine, University of Bari Aldo Moro, Policlinic, Bari, Italy

Abstract. *Background and Aim of the work:* Since December 2019, a new infectious disease known as Coronavirus disease (Covid-19) has rapidly spread globally until it has been declared a pandemic by the World Health Organization. At the same time, if we consider the University context, there is little attention paid during basic nursing education to emergency response, and faculty members report feeling poorly prepared to teach students about this topic. The present study aims to investigate how the Covid-19 pandemic condition influenced the psychological well-being of the Italian nursing students. *Methods:* An online questionnaire was administered to Italian nursing students which contains two parts: a demographic section and the assessment to the psychological well-being nursing student with the Impact of Event Scale-Revised and the Patient Health Questionnaire-9. *Results:* Given the emergency health situation from Covid-19, our initial concern was to find a large number of students with difficulties in mentally processing this situation even with problems such as depression, as their future profession is heavily involved in the management of this pandemic. Fortunately our results have denied our initial hypothesis since both the impact management levels of the event, assessed with the IES-R scale, and the depression levels, assessed with the PHQ-9 recorded values that were almost normal. *Conclusions:* Nursing students are better able to face the situation since they find themselves in the role of spectators and not in the role of actors in the care of patients with Covid-19. If the training ameliorates psychological well being, therefore, it is necessary to provide and preserve nurses expertise to encourage teaching in nursing degree courses on maxi emergencies to prepare future nurses to face them adequately. (www.actabiomedica.it)

Key words: COVID-19, Impact of Event Scale-Revised, Nursing Student, Patient Health Questionnaire-9, Student Perception

Introduction

Since December 2019, after the initial spread in China, a new infectious disease known as Coronavirus disease (COVID-19) has rapidly spread globally until it has been declared a pandemic by the World Health Organization (1). Its rapid spread and lethality are proving to be higher than in previous epidemics also due to the high number of international trips and population movements (2), leading to urgent public health measures in many countries, including Italy (3).

As healthcare systems prepare to care for a wave of affected patients, those with a teaching mission face the added challenge of balancing the educational needs and safety of trainees with those of delivering patient care. In response to concerns for student welfare, medical and nursing schools have suspended classroom-based education and clinical rotations (4). Italian Universities have called on training programs to allow flexibility for graduating students who may have been removed from clinical rotations because of safety concerns (5).

Previous studies have shown that in the case of severe acute respiratory syndrome (SARS) in 2003 and H1N1 flu in 2009, the community has experienced situations of fear and panic with a consequent psychological impact. Previous SARS and H1N1 epidemics have highlighted how health care workers are the most affected subjects in the sphere of their psychological well-being, especially those who are at the forefront of patient treatment (6,7). Stress, anxiety and depression can be seen as normal emotional reactions to a pandemic (8).

During severe acute respiratory syndrome (SARS), psychological distress among healthcare professionals appeared gradually: fear and anxiety appeared immediately and decreased in the early stages of the epidemic, but depression, psycho-physiological symptoms and post traumatic stress symptoms appeared later and lasted for a long time, leading to profound impacts (9). Being isolated, working in high-risk positions, and having contact with infected people are common causes of trauma (10).

At the same time, if we consider the University context, there is little attention paid during basic nursing education to emergency response, and faculty members report feeling poorly prepared to teach students about this topic (11).

Bergeron et al. (12) stated that: "effective emergency response is essential, especially in light of the continuing threat of new epidemics such as avian flu". Researchers have begun to address the education needs, major concerns and fears of nursing students in relation to influenza and emergency or disaster response (13-15). Still to be explored are the roles nursing students could play, the education and preparation they may require to fulfil these roles and the support measures that need to be in place so they can effectively and safely operate as front-line health-care workers.

Aim

In light of everything abovementioned, the present study wanted to investigate how the COVID-19 pandemic condition influenced the psychological well-being of the Italian nursing students. In particular we explored how nursing students deal the pandemic

COVID-19 condition and if they are in depression condition or not.

Materials and Methods

Measures

An observational descriptive study was conducted. The on-line questionnaire was developed in an anonymous form through the Google Modules function and it is administered in the period from 25 Mars 2020 to 25 April 2020.

To pursue the aim of the present study, we investigated how the health emergency from COVID-19 influenced the students attending the degree course in Nursing.

In particular, we wanted to investigate the level of perception of the pandemic event with the Impact of Event Scale-Revised, IES-R) (16) and the possible presence of depressive states among students thanks to the Patient Health Questionnaire (PHQ) version 9 (17).

The questionnaire is made up of two parts. The first part of the questionnaire collected socio-demographic information, namely: gender, age divided into 3 age classes, year of enrollment in the degree course in Nursing, the Region where the student attends the course, if located in the North, Central or South of Italy.

The second part contains the Impact Scale of Event Revised (IES-R) and the Patient Health Questionnaire, version 9, (PHQ-9).

The IES-R presents a list of difficulties that people can face following stressful events. In the present study the stressful event is represented by the health emergency from COVID-19. In fact, the invitation to participants was to respond to the items of the IES-R referring to the period from 5 Mars 2020 since the time of filling in the questionnaire, or starting from the day on which all Italian universities suspended the front university lessons, as well as all the internship activities related to the degree course in Nursing. For each question, only one answer was required, with the following associations: 0 for "not at all", "1" for "a little", "2" for "moderately", "3" for "enough", "4" for "extremely".

In addition to obtain a total IES score, 3 sub-dimensions are obtained from the scale:

- Sub-dimension of the avoidance (n. 5,7,8,11,12, 13,17,22 item),
- Sub-dimension for intrusiveness (n. 1,2,3,6,9,14, 16,20 item),
- subdimension to the hyperarousal (n. 4,10,15,18, 19,21 item).

Furthermore, it was administered the PHQ-9, which is a short scale used for the diagnosis and determination of the severity of depression. The PHQ-9 consists of two questions.

The first question investigates the presence in the COVID-19 period of the 9 symptoms of depression. Each symptom is evaluated with a 4-point scale, where the value "0" indicates "never", the value "1" indicates "a few days", the value "2" indicates "more than half the days", the value "3" indicates "almost every day".

The second question assesses the functional impairment that depression causes in the normal course of the student's daily life. The PHQ-9 score has a range between zero and 27.

Scores between zero and 4 indicate the absence of depression, scores between 5 and 9 indicate the presence of sub-threshold depression, scores between 10 and 14 indicate the presence of mild major depression; scores between 15 and 19 indicate the presence of moderate major depression. Finally, scores above 20 indicate severe major depression.

In the event of depression, the second question of the PHQ-9 is posed in which it is asked whether or not there has been a functional impairment to the performance of ordinary life activities. Also to this question is associated a 4 points scale in which the zero value stands for "not at all difficult", the value "1" indicates "enough", the value "2" indicates "for very difficult" and the value "3" indicates for "extremely difficult".

Participants

Only university students attending the degree course in Nursing in one Italian University were invited to this survey.

The study included all students of the degree course in Nursing, enrolled regularly in the first, in the

second year, in the third year and also those enrolled in the fourth year, as they did not manage to finish the training course in time.

The questionnaire was advertised by the Nursing students of the University of Bari through their Facebook and Instagram pages.

All students attending the degree course in Nursing in Italy were able to participate in the interview. Initially we thought we were going to collect at least 1000 questionnaires, instead at the end of the period considered only 285 students sent their complete questionnaire in the answers (answer rate=28.5%).

Statistical analysis

Collected data were entered in an Excel sheet and statistical processing was performed with the IBM SPSS program version 20.

Socio-demographic informations of the student population were presented as numbers and percentages for categorical variables, while differences existing according to the gender were assessed with the t-test for independent samples.

Furthermore, to evaluate the statistical significance among the answers obtained grouped by age groups, by Region of the degree course and by year of attendance course, the ANOVA test was used for the IES-R scale and the chi quadro (χ^2) test for the PHQ-9 items, both for the first and second questions too.

Ethical consideration

Each student participated voluntarily in the study and his data were treated in respect of their privacy. The participation to the on-line questionnaire was an implicit consent.

This study was approved with id number 6404 by the Community Review Board (CRB) of General Hospital, Policlinic of Bari.

Results

285 nursing students answered the online questionnaire. Of these, 245 (85.97%) are women and 40 (14.03%) are man. 48 (16.85%) students are aged up to

20 years, 230 (80.70%) students are aged between 21 and 30 years and only 4 (1.40%) nurses are older than 30 years. Of the 285 students, 111 (38.95%) nursing students attend the degree course in Nursing in a Region of the Northern of Italy, 55 (19.30%) students attend the University in a Region of the Central of Italy and 119 (41.75%) students attend the degree course in a Region of the Southern of Italy.

In addition, 39 (13.68%) students attend the first university year, 94 (32.98%) students attend the second year and 140 (49.12%) students attend the third year. Only 12 (4.21%) students attend the first year the prescribed time (IV year), (Table 1).

As regards the calculated values for the IES-R reported in Table 2, it can be noted that the total value of the IES-R is significantly greater among female students than male students ($p < 0.001$). This statistically significant difference is found in particular in the sub-dimensions of intrusiveness ($p = 0.006$) and hyperarousal ($p < 0.001$). In fact, female students are more intrusive and more vigilant than male students. As shown in Table 2, the three sub-dimensions of the IES-R and the total score of the IES-R do not significantly differ according to students' age, the latter divided into 3 classes of age. The same trend is evident if we consider students as divided in Regions of Italy

to which they belong to their degree course, in fact also in this case there are no statistically significant differences both in the total score of the IES-R and in the 3 sub-dimensions of the same. Considering the sample of students divided by year of attendance their nursing degree course, there is no statistically significant difference in the IES-R total value, either in the three sub-dimensions of the same.

As regards the PHQ-9 (Table 3), the χ^2 test assesses none statistically significant differences between the socio-demographic variables considered. In any case, data are comforting given that only 17 out of 285 female students have PHQ-9 values higher than 20, indicating a severe depression.

Table 4 shows the frequencies and percentages of responses to PHQ-9 regarding the functional aspect and assessed the relative differences according to gender, age groups, regions of origin and year of attendance for the degree course in Nursing. There is only a statistically significant difference in the responses given by gender ($p < 0.001$). In fact, female students who answered in the negative compared to the male students are greater. Therefore there is a depressive state more present among female students, than among male students. Other significant differences between the students divided according to the other variables are not evident, as the level of answers is equivalent among the respondents.

Table 1. Socio-demographic characteristics of nursing students (n=285)

Characteristics	n; (%)
Gender: Female Male	n=245; (85.97%) n=40; (14.03%)
Class of Age (years): ≤20 years 21-30 years ≥30 years	n=48; (16.85%) n=230; (80.70%) n=4; (1.40%)
Region of nursing course: North Centre South	n=111; (38.95%) n=55; (19.30%) n=119; (41.75%)
Year of the nursing course: I year II year III year IV year	n=39; (13.68%) n=94; (32.98%) n=140; (49.12%) n=12; (4.21%)

Discussion

The main objective of this study was to investigate how the nursing students experienced the COVID-19 pandemic period since for safety reasons, they had been suspended in their internships in hospital wards and, at the same time, they were watching news related to their fellow colleagues involved in the care of patients with COVID-19.

In addition, in the collection of socio-demographic data, we wanted to consider beyond the age groups, the Regions to which the Italian universities belonged. The guiding thought was dictated by the epidemiological trend of the pandemic as the regions of northern Italy were more affected than the regions of central and southern Italy. Furthermore, the year

Table 2. The Impact of Event Scale-Revised answers among participants (n=285)

Demographic characteristics/ IES-sub dimensions	Avoidance	Intrusiveness	Hyperarousal	IES sub dimensions total
Gender:				
Female	1.49±0.78	1.51±0.84	1.70±0.96	1.56±0.78
Male	0.83±0.55	0.78±0.57	0.99±0.64	0.85±0.50
p value ^a	p=0.130	p=0.006**	p=0.001***	p<0.001***
Class of Age (years):				
≤20 years	1.32±0.80	1.49±0.74	1.65±0.88	1.45±0.80
21-30 years	1.59±0.84	1.18±0.58	1.51±0.61	1.52±0.72
≥30 years	0.75±0.28	0.62±0.17	0.93±0.65	1.40±0.69
p value ^b	p=0.308	p=0.347	p=0.906	p=0.479
Region of nursing course:				
North	1.40±0.80	1.37±0.82	1.64±0.93	1.46±0.78
Centre	1.40±0.83	1.51±1.00	1.76±1.09	1.54±0.87
South	1.39±0.77	1.40±0.80	1.48±0.89	1.42±0.76
p value ^b	p=0.993	p=0.600	p=0.160	p=0.654
Year of the nursing course:				
I year	1.31±0.76	1.34±0.83	1.64±0.97	1.41±0.77
II year	1.31±0.81	1.34±0.87	1.55±0.96	1.38±0.82
III year	1.49±0.79	1.49±0.85	1.64±0.95	1.53±0.78
IV year	1.33±0.62	1.23±0.61	1.35±0.79	1.29±0.62
p value ^b	p=0.318	p=0.454	p=0.705	p=0.463

a=Independent t-test; b=ANOVA test

*=p value<0.05; **=p value<0.01; ***=p value<0.001

of attendance of the course was asked as we expected that students enrolled in the third and final year of the degree course could show greater difficulties in dealing with the situation and register a worse depressive state since they were now close to becoming nurses. We honestly would have expected a higher number of responses to the questionnaires, instead the rating answer was 28.5%. Instead in our predictions we thought we could reach the 1000 questionnaires completed in the period of time considered.

Female students responded in more numbers (85.97%) than male students (14.03%). Mostly nurses aged between 21 and 30 responded, mostly attending the degree course in a region of southern Italy (41.75%) and northern Italy (38.95%). At the time of the questionnaire administration, 140 students attended the third and final year of the degree course in Nursing.

The data collected show non-worrying values both for the IES-R and for the PHQ-9. In fact, in assessing the difficulties that students encounter in

dealing with situations following the stressful period, the COVID-19 pandemic, values of the answers given have shown a good ability on the part of students to know how to deal with the period of health emergency.

In particular, male nurses are better in this sense, given that they register lower IES-R levels than female students, especially in the sub-dimensions of intrusiveness and hyperarousal. Therefore even if the values recorded are still normal, the female students are more difficult to face the period of the COVID-19 pandemic.

On the other hand, there are no substantial differences considering the IES-R values compared with the age variable, of the Regions belonging to the course of study, to the year of attendance. In reality, we expected that in the Regions that were most affected by the COVID-19 pandemic, more worrying values than IES-R could be registered.

Fortunately this did not happen. In fact, the values of IES-R, divided by Regions of Italy are not dif-

Table 3. Patient Health Questionnaire (n=285)

Demographic characteristics/ PHQ-sub groups	Depression Absent score: 0-4	Sub-threshold Depression score: 5-9	Mild Major Depression score: 10-14	Moderate Major Depression score:15-19	Severe Depression score: ≥20	p value
Gender:						
Female	n=39 (13.69%)	n=88 (30.88%)	n=61 (21.40%)	n=40 (14.03%)	n=17 (5.97%)	n.s.
Male	n=14 (4.91%)	n=15 (5.26%)	n=7 (2.46%)	n=4 (1.40%)	n=0 (0%)	
Class of Age (years):						
≤20 years	n=7 (2.46%)	n=19 (6.67%)	n=14 (4.91%)	n=6 (2.10%) n=37 (12.98%)	n=4 (1.40%) n=13 (4.56%)	n.s.
21-30 years	n=44 (15.44%)	n=77 (27.02%)	n=72 (25.26%)	n=0 (0%)	n=0 (0%)	
≥30 years	n=1 (0.35%)	n=2 (0.70%)	n=0 (0%)			
Region of nursing course:						
North	n=25 (8.77%)	n=36 (12.63%)	n=27 (9.47%)	n=17 (5.97%)	n=7 (2.46%)	n.s.
Centre	n=8 (2.81%)	n=15 (5.26%)	n=17 (5.97%)	n=8 (2.84%)	n=7 (2.46%)	
South	n=11 (3.86%)	n=52 (18.25%)	n=24 (8.42%)	n=20 (7.02%)	n=3 (1.05%)	
Year of the nursing course:						
I year	n=5 (1.75%)	n=17 (5.97%)	n=12 (4.21%)	n=4 (1.40%)	n=1 (0.35%)	n.s.
II year	n=20; (7.02%)	n=32 (11.23%)	n=22 (7.72%)	n=14 (4.91%)	n=6 (2.11%)	
III year	n=25 (8.77%)	n=50 (17.54%)	n=30 (10.53%)	n=25 (8.77%)	n=10 (3.51%)	
IV year	n=3 (1.05%)	n=4 (1.40%)	n=4 (1.40%)	n=1 (0.35%)	n=0 (0%)	

*=p value<0.05; **=p value<0.01; ***=p value<0.001; n.s.=not significant

ferent from each other, this therefore shows that the incidence rate of the pandemic did not negatively influence, in terms of IES-R, students involving in the study.

The same trend is recorded if we consider the responses of the IES-R with respect to the year of attendance of the degree course. Basically, no statistically significant differences were highlighted and this implies that students enrolled in the third year of the degree course in Nursing do not have more negative or specific aspects than other students. From the data

presented it is clear that the values of IES-R are different only when compared with gender, as female students are more affected by this pandemic period by recording values of IES-R plus other than the male students.

In addition, the data relating to the IES-R is validated by the subsequent data recorded for the PHQ-9. In fact, out of 285 students, 17 have severe depression levels. All 17 are female students, 4 of them under the age of 20, 13 with the ages between 21 and 30 years. 7 of them attend the degree course in a region of north-

Table 4. PHQ- functional evaluation that depression causes on the normal development of the student's life (n=285)

Demographic characteristics	For nothing	Quite	Very	Extremely	X ² test p value
Gender:					
Female	n=85 (29.82%)	n=121 (42.46%)	n=25 (8.77%)	n=14 (4.91%)	X ² =0.000 p<0.001***
Male	n=28 (9.82%)	n=10 (3.51%)	n=1 (0.35%)	n=1 (0.35%)	
Class of Age (years):					
≤20 years	n=16 (5.61%)	n=24 (8.42%)	n=7 (2.46%)	n=1 (0.35%)	X ² =0.970 p=0.947
21-30 years	n=93 (32.63%)	n=106 (37.19%)	n=19 (6.67%)	n=14 (4.91%)	
≥30 years	n=4 (1.40%)	n=1 (0.35%)	n=0 (0%)	n=0 (0%)	
Region of nursing course:					
North	n=47 (16.49%)	n=49 (17.19%)	n=7 (2.46%)	n=8 (2.81%)	X ² =0.381 p=0.251
Centre	n=22 (7.72%)	n=22 (7.72%)	n=7 (2.46%)	n=4 (1.40%)	
South	n=44 (15.44%)	n=60 (21.05%)	n=12 (4.21%)	n=3 (1.05%)	
Year of the nursing course:					
I year	n=15 (5.26%)	n=19 (6.67%)	n=4 (1.40%)	n=1 (0.35%)	X ² =0.885 p=0.654
II year	n=42 (14.74%)	n=42 (14.74%)	n=6 (2.10%)	n=4 (1.40%)	
III year	n=49 (17.19%)	n=66 (23.16%)	n=16 (5.61%)	n=9 (3.16%)	
IV year	n=7 (2.45%)	n=4 (1.40%)	n=0 (0%)	n=1 (0.35%)	

*=p value<0.05; **=p value<0.01; ***=p value<0.001.

ern Italy, 7 in a region of central Italy and 3 in southern Italy. 10 of them attend the last year of the degree course, 6 the second year, and one the first year. There are also 44 cases of moderate depression. Among these cases, 40 are female students and 4 male students, the majority (n=37) aged between 21 and 30 years. 17 of them attend the course in a University of the Northern Regions, 8 in one of the Regions of central Italy and 20 in a Region of southern Italy. 25 attend the third year of the degree course, 14 attend the second year, 4 the first year out of the course. In this case too, the female sex is more affected than the male sex, albeit not significantly.

Also interesting is the finding of a statistically significant difference in the last PHQ-9 question re-

garding the reduced functionality felt by the respondents due to their depressive state. Even in this case it is greater in the female sex, while for the other variables they are not highlighted important differences. Therefore our data show that the gender variable is an important determinant in the values of IES-R and PHQ-9 compared to the other socio-demographic variables considered. The data collected also shows a high percentage of students from the universities of southern Italy and this could be connected to the fact that the project was advertised by the students from a university in southern Italy. The other important percentage of students involved in the study belongs to the universities of northern Italy and in this case, there being a greater incidence of the number of new cases

per day in these regions, perhaps the students felt more sensitized to the pandemic problem.

To date there are several studies on the perception of the COVID-19 pandemic event that concern doctors and nurse workers (18-20). In the Italian literature there are no studies similar on ours for the purpose and design of the study. However, in the international literature there are few studies which have evaluated the psychological condition or the impact that the COVID-19 pandemic influenced students, particularly nursing and medicine students. For example in the Spanish study (21) it was also administered an online questionnaire about knowledge to prevent the transmission of COVID-19 and on the other hand it was assessed confidence and willingness to deal with infected cases. A total of 102 questionnaires were collected in 24 hours. Most of the sample believed that their health state was good. 65.3% did not feel prepared or were barely prepared to attend to cases of COVID-19, although 74.2% were willing to do so if the situation required it, and assumed moral responsibility to care for infected patients. These data are in agreement with our data since on the whole also the students recruited in our study showed a good level of situation management (IES-R values) and in any case there are not many students who have registered a moderate depressive level- serious entity. The study conducted in China can be considered as similar on our study for purposes and results. It was conducted between 22 and 28 March 2020 to explore the mental health status, particularly anxiety and depression in the general population, healthcare professionals, university students during the COVID-19 outbreak. In this study, depressive status was assessed thanks to the PHQ-9 and it was found that the most severe levels of depression are recorded in the female participants. In this sense, our data agree with these as our data also showed a greater depressive state among female students. The studies so far considered and those previously published on other health emergencies such as SARS or other pandemic influential, all contribute to the importance of universities in the implementation of teaching courses dedicated to the maxi health emergencies management (22).

In fact, there are numerous studies in the literature that evaluate the state of knowledge and percep-

tion of female nurses on the accident and emergency nursing and on nursing students' general knowledge and risk perception on pandemic influenza (23-26).

For example, in the past, some studies had instead evaluated the perception of the knowledge and related skills of nursing students on other earth disasters or on viral infections with other etiology, such as the Ebola virus infection (EVD). One example is the study published in the *Journal of Professional Nursing* in 2016 in which nurses' knowledge of viral infection, their willingness to treat and perceptions of their duty to treat was assessed (23). This study concluded that basic EDV knowledge and training appeared to be critical to ensure willingness to treat. However, it is imperative that students have an in depth understanding of the principles of infections diseases in general.

Also the study by Yonge et al.(24) surveyed nursing students at the University of Alberta to determine their general knowledge and perception of risk associated with pandemic influenza. Their findings underlined that there are many misconceptions about the nature of a potential influenza pandemic that affect nursing students' perceptions of potential and familial risk and that is imperative for nursing students to receive adequate information, education and preparation along with the necessary personal perception equipment if they are going to be relied upon as a labour severe in the event of a pandemic.

In another study by Satoh et al. in 2016 (25), knowledge and skills are examined among university nursing students who participated in relief activities following the 2016 Kumamoto earthquakes. The study showed that the Disaster Nursing knowledge and competencies by enrollment status in a disaster nursing program may include:

- understanding and implementation of assistance to victims in collaboration with other disaster response team members;
- understanding of natural disasters' influence on victims;
- ethical practice in a disaster recovery area;
- understanding of their role within the disaster relief organization.

Finally, in the study of Patel et al. (2017) (26) the level of knowledge was defined a prior-key training which can influence health science students' willing-

ness to attend to cases infected by MERS-CoV, as well as their attitudes and confidence.

It follows that the condition of student or worker in this pandemic period turns out to be strongly different if one considers psychological health. Surely nursing students are better able to face the situation since COVID-19.

Conclusions

This study wanted to investigate the psychological state of nursing students during the COVID-19 pandemic. Some limitations to our study relate to not having considered students' initial knowledge of COVID-19 infection at all and to concentrating exclusively on their psychological condition in this moment of health emergency. This conceptualization, however, has been influenced by the existing literature on the psychological condition of nurses who have shown little encouraging data making us arouse interest in investigating this condition among students of the same profession.

In fact, many studies conducted especially in China have shown worrying levels of anxiety, depression, insomnia among nurses during the COVID-19 outbreak (27-31). In even more recent studies investigating the initial state of knowledge on the ways of transmission and containment of COVID-19 and on the state of anxiety and depression of students, especially nursing ones, emerged as priority needs: the implementation of teachings on the management of maxi health emergencies and the improvement of new teaching methodologies that the pandemic has entailed (32,33), as the improvement of approaches to online teaching in order to encourage students to stay connected through online or in any social media platform and move together during this extremely difficult time (34-36).

Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

References

1. World Health Organization. WHO announces COVID-19 outbreak a pandemic. Available from: <http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid> Accessed on 3 April 2020.
2. Adams JG, Walls RM. Supporting the Health Care Workforce During the COVID-19 Global Epidemic. *JAMA* 2020, 323(15):1439-1440.
3. Remuzzi A, Remuzzi G. COVID-19 and Italy: what next?. *Lancet* 2020, 30627-9.
4. UNESCO. COVID-19 Educational disruption and response. <https://en.unesco.org>. Accessed: 25 May 2020.
5. Spina S, Marrazzo F, Miglauri M, Stucchi R, Sforza A, Fumagalli R. The response of Milan's emergency medical system to the COVID-19 outbreak in Italy. *Lancet* 2020, 395:49-50.
6. Chua SE, Cheung V, Cheung C, McAlonan GM, Wong JWS, Cheung EPT, Chan MTY, Wong MMC, Tang SW, Choy KM, Wong MK, Chu CM, Tsang KWT. Psychological effects of the SARS outbreak in Hong Kong on high-risk health care workers. *Can J Psychiatry* 2004, 49(6):391-393.
7. Maunder R, Hunter J, Vincent L, Bennett J, Paladeau N, Leszcz M, Sadavoy J, Verhaeghe LM, Steinberg R, Mazzulli T. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *CMAJ* 2003, 168(10).
8. Lee AM, Wong JGWS, McAlonan GM, Cheung V, Cheung C, Sham PC, Chu CM, Wong PC, Tsang WTT, Chua SE. Stress and psychological distress among SARS survivors 1 year after the outbreak. *Can J Psychiatry* 2007, 52(4):233-240.
9. Kang L, Li Y, Hu S. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet Psychiatry* 2020, 7:e14.
10. Koh D. Occupational risks for COVID-19 infection. *Occup Med (Lond)* 2020, 70:3-5.
11. Elrggal ME, Karami NA, Rafea B, Alahmadi L, Al Shehri A, Alamoudi R, Koshak H, Alkatani S, Cheema E. Evaluation of preparedness of healthcare student volunteers against Middle East respiratory syndrome coronavirus (MERS-CoV) in Makkah, Saudi Arabia: a cross-sectional study. *J Public Health* 2018, 26 (6):607-612.
12. Bergeron S, Cameron S, Armstrong-Stassen M, Pare K. Diverse implications of a national health crisis: A qualitative exploration of community nurses' SARS experiences. *Canadian Journal of Nursing Research* 2006, 39(2):42-54.
13. Kawano S, Kakehashi M. Substantial impact of school closure on the transmission dynamics during the pandemic flu H1N1-2009 in Oita, Japan. *PLoS One* 2015, 10:e0144839.
14. De Luca G, Kerckhove KV, Coletti P, Poletto C, Bossuyt N, Hens N, Colizza V. The impact of regular school closure on seasonal influenza epidemics: a data-driven spatial transmission model for Belgium. *BMC Infect Dis* 2018, 18:29.
15. O'Malley M, Voight A, Renshaw T, Eklund K. School climate, family structure, and academic achievement: A study

- of moderation effects. *School Psychology Quarterly* 2015, 30(1): 142–157.
16. Beck JG, Grant DM, Read JP, Clapp JD, Coffey SF, Miller LM, Palyo SA. The Impact of Event Scale-Revised: psychometric properties in a sample of motor vehicle accident survivors. *J Anxiety Disord* 2008, 22(2):187-98.
 17. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001, 16(9):606-613.
 18. Wang Y, Di Y, Ye J, Wei W. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychology, Health & Medicine* 2020, 1–10.
 19. Zhai Y, Du X. Mental health care for international Chinese students affected by the COVID-19 outbreak. *The Lancet Psychiatry* 2020, 7(4): e22.
 20. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, Wu J, Du H, Chen T, Li R, Tan H, Kang L, Yao L, Huang M, Wang M, Wang H, Wuang G, Liu Z, Hu S. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Network Open* 2020, 3(3): e203976.
 21. Cervera-Gasch A, Gonzalez-Chorda VM. COVID-19: Are Spanish medicine and nursing students prepared? *Nurse Education Today* 2020, 92:104473.
 22. Yonge O, Rosychuk R, Bailey T, Lake R, Marrie TJ. Nursing students' general knowledge and risk perception of pandemic influenza. *The Canadian Nurse* 2007, 103(9):23-5.
 23. Chilton JM, Mcneill C, Alfred D. Survey on nursing students' self-reported knowledge of Ebola Virus Disease, willingness to treat, and perceptions of their duty to treat. *Journal of Professional Nursing* 2016, 32(6):487-193.
 24. Yonge O, Rosychuk RJ, Bailey TM, Lake R, Marrie TJ. Willingness of university nursing students to volunteer during a pandemic. *Public Health Nurs* 2010, 27 (2): 174–180.
 25. Satoh M, Iwamitsu H, Yamada E, Kuribayashi Y, Yamagami-Matsuyama T, Yamada Y. Disaster nursing knowledge and competencies among nursing university students participated in relief activities following the 2016 Kumamoto Earthquakes. *SAGE Open Nursing* 2018, 4:1-9.
 26. Patel R, Wattamwar K, Kanduri J, Nehass M, Yoon J, Oh J, Shukla P, Lacy CR. Health care student knowledge and willingness to work in infectious disease outbreaks. *Disaster Med Public Health Preparedness* 2017, 11 (6):694–700.
 27. Chen Q, Liang M, Li Y, Guo J, Fei D, Wang L, He L, Sheng C, Cai Y, Li X, Wang J, Zhang Z. Mental health care for medical staff in China during the COVID-19 outbreak. *Lancet Psychiatry* 2020, 7(4): e15-e16.
 28. Semple S, Cherrie JW. COVID-19: Protecting Worker Health. *Ann Work Expo Health* 2020.
 29. Feng ZH, Cheng YR, Chen J, et al. Chinese medical personnel against the 2019-nCoV. *J Infect* 2020.
 30. Han Q, Lin Q, Jin S, You L. Coronavirus 2019-nCoV: A brief perspective from the front line. *J Infect* 2020, 80:373-377.
 31. Choi KR, Skrine Jeffers K, Logsdon MC. Nursing and the Novel Coronavirus: Risks and Responsibilities in a Global Outbreak. *J Adv Nurs* 2020.
 32. Vitale E. Clinical teaching models for nursing practice: a review of literature. *Professioni Infermieristiche* 2014, 2:117-124.
 33. Sahau P. Closure of Universities due to Coronavirus Disease 2019 (COVID-19): impact on education and mental health of students and academic staff. *Cureus* 2020, 12(4):e7541.
 34. Al-Rabiaahab A, Tamsah MH, Al-Eyadhy AA, Hasan GM, Al-Zamil F, Al-Subaie S, Alsohime F, Jama A, Alhaboob A, Al-Saadi B, Somily AM. Middle East Respiratory Syndrome- Corona Virus (MERS-CoV) associated stress among medical students at a university teaching hospital in Saudi Arabia. *J Infect Public Health* 2020.
 35. Gewin V. Five tips for moving teaching online as COVID-19 takes hold . *Nature* 2020.
 36. Zhai Y, Du X. Mental health care for international Chinese students affected by the COVID-19 outbreak. *Lancet Psychiatry* 2020, 7:e22.

Received: 18 May 2020

Accepted: 31 July 2020

Correspondence:

Elsa Vitale

Department of Mental Health,

Local Healthcare Company, Bari, Italy

Via X marzo, 43, 70026 Modugno, Bari

E-mail: vitaleelsa@libero.it