

# Perception of COVID-19 infection risk among students in healthcare professions: A qualitative study

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**Abstract.** Background and aim of the work: The aim of this study was to describe how students in healthcare professions perceived the risk of COVID-19 infection during their curricular internships in the post-lockdown period, in order to evaluate possible corrective and/or improvement actions to ensure future safe learning experiences. *Methods:* This was a descriptive qualitative study conducted in March 2021 using Focus Groups, with the participation of students from all the involved study programs, based on a voluntary proactive sampling approach. The study was conducted among students in healthcare professions at the University of Bologna, in collaboration with the Local Health Authority of Imola, who were undertaking curricular internships in various public or private healthcare, social, and non-healthcare settings, as specified in the educational plan. *Results:* The results showed that the students reported having knowledge about preventive measures to avoid infection, being attentive observers of the organizational aspects within their internship contexts, and considering the internship tutor as a significant guiding figure in their perception of risk and the related measures to be adopted. Despite the challenges, the students evaluated their internship experience as an opportunity to acquire distinctive skills. *Conclusions:* Students who embarked on their internships without prior experience expressed additional and diverse aspects that warrant further investigation. Therefore, it was deemed necessary to conduct further qualitative research to broaden the perception of SARS-CoV-2 infection risk in this group of students. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** Healthcare student, SARS-CoV-2 risk, perception, COVID-19 risk

## Introduction

Following the spread of COVID-19, on March 9, 2020, all university internships, including those in healthcare professions, were suspended. The resumption of internships was only allowed from June 15 of 2020, in compliance with measures to counter the spread of the virus and based on the organizational conditions present in the affiliated healthcare companies. Risk perception is a cognitive process activated

in various daily activities that guides people's behavior in situations involving potential risks. Risk perception involves various dimensions, such as immediate and future consequences and their implications, both on a rational and objective level and on an emotional and subjective level. It is one of the cognitive processes that guides people's behavior in situations that may pose potential risks (1). Research, however, highlights the discrepancy between how individuals perceive risk and the actual objective assessment of it, meaning that

people may perceive a risk as high when objectively it is not, or perceive a low risk when objectively it is high (1).

Each individual adopts behavior based primarily on intuitive thinking, which influences positive or negative evaluations based on the emotions experienced in relation to certain activities (2).

According to the cross-sectional study by Olum et al. in 2020, conducted online with medical, nursing, dental surgery, and pharmacy students at the University of Uganda, 91% of students have good knowledge of the main symptoms of COVID-19, 74% have a positive attitude towards COVID-19, and only 57% adopt good practices for COVID-19 prevention, such as maintaining proper social distancing, refraining from handshakes, and practicing hand hygiene before touching the face. Students who took an online course on COVID-19 developed better practices compared to others (3).

Several studies conducted during the COVID-19 pandemic have identified factors influencing individuals' perception of risk, including knowledge of virus development, modes of transmission, identification of individuals at higher risk of coronavirus infection, and precautionary measures.

The results reported in the literature include:

- Increased knowledge levels tend to reduce the fear of contracting the infection (4).
- Less experienced medical students have a higher perception of risk compared to seventh-year students (5).
- Medical students who completed internships in the emergency department reported a lower perception of risk compared to students in internal medicine or surgery (5).
- Male gender is associated with a higher perception of risk (6).

Based on the data from the literature, all students were offered a specific mandatory training module that included theoretical knowledge related to the pathophysiology of the virus and clinical data on COVID-19, along with practical simulations on the use of personal protective equipment and correct behaviors to adopt, in accordance with the regulations in place during the

students' curricular internships, specific to healthcare and non-healthcare settings.

At the end of this important training and support program for entering internships, the authors posed the following questions: Did the increase in knowledge levels influence the perception of risk and reduce the fear of contracting COVID-19 among students in Professional Education (PE), Physiotherapy (Pt), Nursing (Nur), and Environmental and Occupational Prevention Techniques (EWPT) courses during their curricular internships in the post-lockdown period? Are there differences in risk perception among students in different years of study and in different healthcare settings?

The aim of this study was to describe the perception of COVID-19 infection risk among students during their curricular internships in the post-lockdown period in 2020 and to assess possible corrective and/or improvement actions, including potential future training, to ensure a safe learning experience.

## Population and methods

This is a descriptive qualitative study; the chosen study design aims to describe how students of Health Professions Study Courses perceived the risk of COVID-19 infection during clinical internships in the post-lockdown period, in order to assess possible corrective and/or improvement actions for ensuring a safe learning experience.

### *Sample*

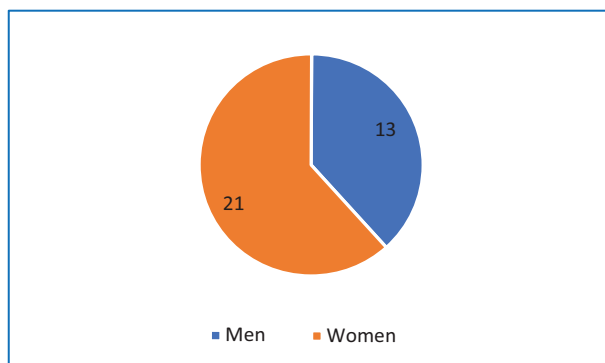
The unit of analysis is the student enrolled in the PE, Pt, Nur, and EWPT study programs, with prior experience in curricular internships before the pandemic period. Proactive sampling was conducted on a voluntary basis to ensure representation from all years of each study program. Students were informed and contacted by the Didactic Coordinators of their respective study programs via institutional email. Once the unit of analysis was defined, inclusion criteria were established based on characteristics that ensured a comprehensive and balanced description of

the experience and impressions related to the phenomenon, including:

- Willingness to participate in the study
- Students in their current year of study
- Numerical representation from all the involved study programs
- Gender representativeness

Figure 1 shows the gender distribution: 13 male subjects and 21 female subjects, for a total of 34 students.

The data collection method used was Focus Groups (FG), which allowed students to interactively discuss their experiences. The FGs were conducted by



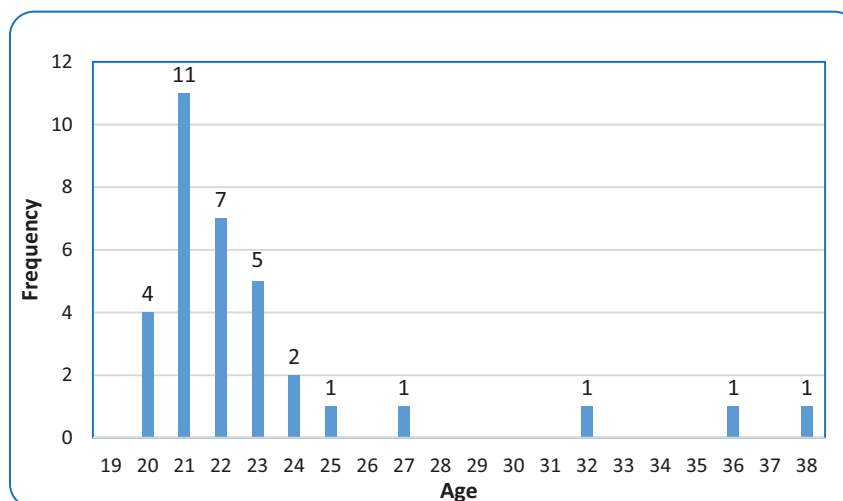
**Figure 1.** Gender distribution of participating students.

experienced researchers in data collection techniques. The group was guided to freely express themselves on the relevant topics, and the methodological phases of FG construction with semi-structured questions were followed. Figure 2 displays the age distribution of the students who participated in the FGs. The average age of the sample is 23 years.

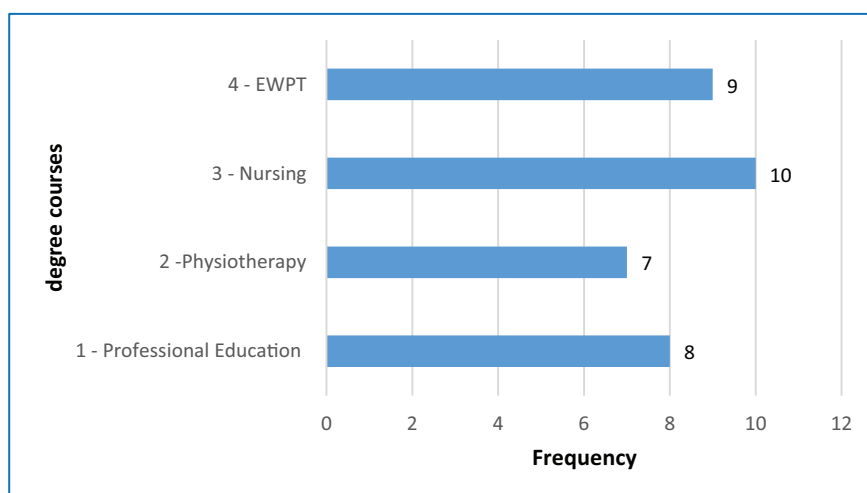
Figure 3 shows the representativeness of the survey among students for each study course.

### *Procedure*

Three Focus Groups (FG) were conducted in person, one for each year of study, involving all students from all degree programs, in February and March 2021. The FG setup involved arranging the students in a semicircle in the classroom, ensuring all safety measures were taken to prevent the spread of SARS-CoV-2 in accordance with the guidelines of the educational institution. Participation in the event was subject to signing the informed consent form for the study and data processing. The collected information was treated anonymously and in aggregated form. Each student was assigned an alphanumeric code referring to their year of study and using the corresponding initial letter(s) of their profile to protect their privacy. The study took place at the Education Center/Section of the degree programs at the University of Bologna,



**Figure 2.** Distribution of students who participated in the focus group.



**Figure 3.** Distribution of students who participated in the study by degree program.

located at the Usl di Imola healthcare facility. The Heads of Professional Education Activities (HPEA) of the degree programs participated in the research, and the Degree Program Councils unanimously approved the project. The Bioethics Committee of the University of Bologna approved the study (Prot. No. 0016749 dated 26/01/2021). A total of 34 students:

- The 1st FG involved 10 students from the 3rd year (academic year 2019/2020);
- The 2nd FG involved 11 students from the 2nd year (academic year 2019/2020);
- The 3rd FG involved 13 students from the 1st year (academic year 2019/2020).

The conducted FGs had varying durations, ranging from 1 hour and 04 minutes to approximately 1 hour and 29 minutes. They were audio-video recorded and later transcribed in full. To enhance the completeness and robustness of the collected data, researcher triangulation was performed, involving an inductive analysis of the data on multiple levels: a first level involved thematic analysis of the text with at least 2 careful readings of the transcriptions, and a second level involved the extraction of simple concepts called subcategories. The subcategories were shared and defined in plenary sessions, and based on similarities, they were grouped into categories. The categories were then further grouped into themes, with each theme given a unique name.

### *Data analysis*

Third-year students felt much more protected in the healthcare setting in terms of infectious risk compared to any other environment, due to the strict behaviors to be followed and the use of protective measures, in line with the theoretical and practical training they received before starting the internship. It was not always possible to maintain social distancing during patient-related activities, which sometimes created fear of virus transmission, particularly towards family members rather than themselves. The students reported that the organization within the healthcare setting and the example set by their assigned tutors influenced their risk perception. From their words, a strong sense of responsibility to contain the risk of infection emerged, both towards the patients and their own social network. They often emphasized the existence of a “before the pandemic” and an “after the pandemic” reality in the various internship settings, highlighting the profound transformation they were experiencing. Second-year students also expressed a clear understanding of the behaviors to be adopted to minimize the risk of infection. Thanks to the theoretical and practical knowledge acquired through their training, they found the internship experience highly educational. The internship helped these students become aware of the risk perception regarding SARS-CoV-2 infection, based on the behaviors observed and

adopted by the professionals in the setting. They realized that the organizational and behavioral rules established within the setting had positive or negative consequences, which led them to pay greater attention to their professional actions during the internship compared to before. First-year students, who were experiencing their first internship at a healthcare facility, showed less awareness of risk perception. For nursing and physiotherapy students, the internships were organized in non-COVID healthcare contexts, while EWPT students replaced in-person experiences with online seminars. Additionally, Education students had enhanced online briefings with simulated clinical cases. The students' testimonies were filled with emotions, perhaps to compensate for their lack of practical experience and concerns about acquiring the expected skills due to the reorganization of internships in the post-lockdown period. For this group of students, the risk of SARS-CoV-2 infection was overshadowed, and they felt confident in their behaviors and the use of Personal Protective Equipment (PPE) due to the experience and guidance provided by their tutors. In all the Focus Groups, nursing students did not show differences in their perception of SARS-CoV-2 infection risk across different healthcare settings, despite their direct contact with patients. They considered the risk of infection as inherent in their chosen profession.

## Results

Based on the emerging content, the following six themes were identified.

### *Theme 1: Meaning of risk*

Students attribute the meaning of risk, during their curricular internship, to the possibility of contracting SARS-CoV-2 infection. *"Instead, I perceive risk simply as the possibility of getting infected myself and, in turn, the possibility of infecting my family members, who may be at higher risk than me based on their health status" (3°Nur1)*, both through contact with patients, *"the likelihood of getting sick while being in a clinical internship setting" (2°Nur3)*, and through contact with other healthcare professionals, relating it to their own or

others' incorrect or non-compliant behaviors with the imposed rules. *"Also, behaviors, both our own and those of others, that can expose us to risk" (2°PE6)*. *"User behaviors, often unaware of the current reality, can put themselves, other users, and even healthcare workers at risk" (2°PT2)*. There is also a clear perception of the potential for becoming carriers of contagion, which is conveyed to the assisted user or their family members.

The perception of risk for students belonging to the Nursing CS (Clinical Setting) does not seem to have changed in this context, because standard and additional precautions were already part of their knowledge and practice even before the pandemic, with the exception of the mandatory use of masks in all healthcare environments and for assisted individuals.

### *Theme 2: Contents, timing, and methods to carry out internship safely*

The students have learned the content from various sources and through different methods: online lessons and distance courses (hereinafter referred to as DL) on the SELF-PA portal of the Emilia-Romagna Region (*2°Nur3; 2°EWPT4; 2°PE7; 1°Pt6*), in small groups with synchronous online meetings conducted by the Didactic Coordinators/Tutors of reference (*1°P7; 1°Nur11; 2°Nur11; 2°Pt2; 2°Pt4; 3°Nur1; 3°EWPT6*), through organizational documents of the healthcare and social facilities where they would be placed for their internships (*3°Pt2*), in addition to information obtained through signage within the Operational Units (*1°Nur11*), available Operating Instructions (*3°Pt2*), the internet (*3°Pt4*), news (*3°EWPT4*), and the media (*3°PE8*).

An important reference has also been the internship tutors. The content has covered preventive measures to be used and correct behaviors to be observed (*2°Nur11*), biological risk (*2°Pt4*), the correct use of Personal Protective Equipment (PPE) (*3°N1*): dressing, undressing, the use of gloves, masks (*1°Pt6*), and disinfection (*2°PE6*).

The students in the Professional Education CS observe that the DL courses attended were mainly focused on the hospital environment and healthcare personnel and were not particularly tailored to



community/territorial facilities (2°PE6), which have different characteristics and specificities.

*Theme 3: Factors that positively influenced the perception of risk during the internship*

The facilitating elements that helped students integrate into the healthcare context during post-lockdown internships can be identified at various levels.

The first level pertains to activities organized by year coordinators/educational tutors of the training section to accompany students in their entry into the internships. These activities include laboratory work and provided explanations, the transmission of technical content and opportunities for communication and sharing. "We were prepared... we attended some laboratories". These activities, both theoretical and practical, conducted before the internships, conveyed knowledge and skills related to the preventive measures and protection to be adopted concerning biological risks. This training, amplified by the emergence of the pandemic phenomenon, constitutes an added professional value, as it will always be necessary in the future for preventing the spread of any microorganism (1° Nur12; 1°PE1).

The second level is represented by the opportunity for communication and support from peer and internship tutors, "Even communication, sharing of what we expected in the different facilities, helped us enter the internship experience in a very reassuring manner" (1°PE1).

Another facilitating element during internships in the post-lockdown period was identified in the presence of dedicated internship tutors, who were available and caring, "The tutors took care of me despite the situation and, despite the difficulties they already had in their profession, they tried to seize every opportunity to make me learn something". They were well-prepared with a professional attitude. "I felt very protected ... by my tutor and the coordinator" (3°PE8) and they were in line with updated content available about the pandemic, as presented to students by CS Coordinators in the preparatory meetings for entering the internships (3°PE9, 3°N3, 2°Pt9).

The internship tutors are also recognized as a role models for adopting correct behaviors. "Having someone to imitate definitely helps..." (3°Pt4), a model to

observe directly. "Direct observation of the tutors... reference personnel" (2°PE7), provides advice on behaviors to adopt and integrates the knowledge possessed by students. "A reference tutor who advised step by step on how to behave, all the devices... was definitely helpful... and integrated what we learned in the courses" (2°Pt5).

Another element that supported internships was finding organizational consistency between good practices for preventing biological risks and what was actually observed during the internships. "I felt much safer in the hospital than walking on the street or shopping, because fortunately, I was in the ward... where they were very strict, so honestly, I felt safer in the hospital than outside" (3°Nur3), in addition, to a calm and organized internship environment. "So, you go there and see that everything is calm ... it's much more the initial part, in my opinion, than when you actually arrive at the site..." (1°Nur12).

The adoption by the organizational company of periodic diagnostic test for possible SARS-CoV-2 infection among staff was also reassuring for students to whom it was extended. "I felt very protected from the beginning, as we performed serological tests from the start, which were also repeated over time" (3°PE9; 3°Nur3), and also for the patients. "The patients entered after undergoing a swab, so in any case, we had the results if they were positive or negative within 24 hours, but in the meantime, they wore surgical masks and also the fact that it was an environment where we were protected due to the presence of protective devices and their correct use" (3°PE9, 3°Nur1).

*Theme 4: Elements that negatively influenced the perception of risk during the internship.*

The terms fear, anxiety, and concern are recurring in the words of the interviewees. Fear was linked to the risk of contracting the virus, infecting their own family members and cohabitants. Even with safety precautions in place, contact was still perceived as a risk for oneself and others they came into contact with. "But I was afraid of bringing Covid to my family... I mean, I was afraid of becoming infected during an internship... in the hospital and consequently infecting my family..." (2°Nur11).

In some cases, students were placed in difficult situations in the context of their internships

due to the presence of behaviors by figures of authority that were not consistent with protective measures. *“Not everyone actually respected the rules/regulations correctly ... and I have to say that this made me a bit anxious”* (2°PE5). The need to maintain social distancing and the use Personal Protective Equipment (PPE) created obstacles to practicing the professional skills they had learned. *“Since we had our entire face covered, we had to find different ways... to understand a person’s pain and suffering rather than a moment of joy and sharing and learning how to communicate and share it together”* (1°PE1); *“social distancing, was quite complicated in physiotherapy; manual contact is a part of our daily life, especially for some of the treatments we provide”* (3°P7).

#### *Theme 5: Perception of risk and influences on career choice*

After delving into reflections on the internship experience, we wanted to understand if what students had experienced had repercussions on their career choice. The data that emerged indicate that all students confirm their chosen profession, saying, *“when you choose to pursue a career in the healthcare field, you already know the basic risks that may exist, and that people will need you”* (2°Pt4); *“the perspective changes, what you might be dealing with changes because there is more focus on infectious risk, biological risk, on Covid, both in the internship setting and in general... but it doesn’t change the profession I wanted to pursue ... I mean, the professional I want to become”* (2°Pt9); *“... as a profession, as a person ... it doesn’t change because is always the same ... of course, there will be technical adjustments to make, but since ... let’s say the essence of nursing doesn’t change... because in the end, the workload probably changes, how you relate changes... many things change, but as essence, it doesn’t change”* (3°Nur3). The experience during the pandemic has increased awareness of the potential and complexity of the nurse profession. *“The fact that Covid happened happened helped me because I saw what nurses do inside the ward ‘more than anyone else’... I realized that it’s not the profession I thought it was, but it’s much more...”* (1°Nur12); *“Personally, i now see nurses differently... I mean, more than different, in another way than I didn’t have before ... the pandemic has added value to the profession”* (2°Nur11).

#### *Theme 6: Matured acquisitions*

The experience of the pandemic has generated new sensitivities and attentiveness in relationships with patients and in the development of communicative methods mediated by the use of masks. Attention to non-verbal communication methods, such as touch, gaze, and body movements, has been emphasized: *“I’ve learned to understand people without seeing the movements of their mouths... and so I’ve developed another way of understanding people without looking at their lips”* (2°Nur11); *“the importance of being able to adapt your behavior to different situations, in this case, the pandemic... I mean, at least for our patients, it’s not like with you have to stop doing things with Covid... I mean, they still need support, and it’s up to you figure out how to continue providing it in different ways”* (2°PE8); *“before Covid, we took many things for granted... I mean, even just facial expressions”* (2°Nur10).

*A sense of responsibility has matured, linked to feeling like professionals not only in the healthcare context during internship hours but also in daily life. “Especially as healthcare workers, we have a dual responsibility, both for ourselves and for others... also in terms of education”* (2°Nur11). The internship experience has been seen as an added value that has prepared students for possible future similar pandemic events. *“I saw it as an added value, something for which I am more prepared if it were to happen again... you are prepared... you have already experienced it”* (1°Nur12); *“...in this situation, responsibility doesn’t end when you leave the ward... I mean, in the sense that... it continues even outside because then you have to go back to the ward, and what you did outside could have repercussions inside”* (1°Nur10); *“I understood how important it is, in addition to knowing the law, the specific safety regulations, the decrees... how important the psychological aspect is involving the worker in risk perception of risk, to make them understand it... because if they are only told about the law in my opinion, they don’t take away the result of making them wear a mask... I don’t know how to put into words... so not only is the technical aspect important but also the human and psychological aspect ... I saw a human aspect that I didn’t expect to find in this profession”* (1°Pt4).

Compared to previous academic years, applying pandemic containment measures has led to an increase in internship opportunities, which have also seen an extension of the duration within the same context. This situation has been perceived positively by students, as staying longer in the same internship setting has created a sense of being integrated members within the organization.

## Conclusion

From the qualitative descriptive study conducted, it emerged that students who had access to internships during the post-lockdown period reported having clear knowledge about the development of the virus, the modes of transmission, identification of individuals at higher risk of Coronavirus infection, and precautionary measures (1). The students stated that they correctly applied the precautionary measures in accordance with the requirements of the organization in which they were interning. The findings confirm what has been reported in the literature, namely that an increase in knowledge levels tends to reduce the fear of contracting the infection (4). The acquired knowledge through the provided training enabled the students to confidently face the post-lockdown internship and manage potential risk situations. Experienced third-year students expressed greater confidence in dealing with internships and a more balanced perception of risk compared to first-year students who were experiencing an internship for the first time. This supports the findings of Taghrir MH et al.'s study in 2020 (5), which concluded that less experienced students developed a higher perception of risk compared to students nearing the end of their training. It is highlighted, as reported in previous studies, that the perception of risk among students can be influenced by the internship setting and the pursued degree program. Students who interned in socio-assistance settings perceived a different level of rigor in the application of procedures and behavioral rules for infection prevention, leading to an increased perception of infection risk. Conversely, students who completed their internships in hospital settings, especially those with high levels of care intensity, reported a different perception of

infection risk (5). Nursing students expressed a different level of perception of infection risk compared to students from other degree programs included in the study. This difference is attributed to their prior and established possession of many of the required infection prevention contents, which were already part of their curriculum before the pandemic. The study did not investigate the perception of risk based on gender due to the chosen study design and sampling methodology (6). However, it emerged from the students' words, significantly, that the figure of the internship tutor, who accompanies the student, plays a central role in influencing the perception of infection risk. The professional behavior exhibited by the internship tutor and the consistency observed in their actions with the acquired training course contents were perceived as particularly reassuring. Despite the objective difficulties encountered during the period, the students expressed appreciation for the internship experience as an opportunity to acquire distinctive skills that would enable them to manage similar critical situations in the future. They unanimously reaffirmed their pre-pandemic career choice. Some aspects warrant further exploration, such as comparing students who had already completed internships before the COVID-19 pandemic with those who started internships without such reference. Therefore, it was deemed necessary to conduct an additional qualitative study to explore the perception of SARS-CoV-2 infection risk among students who only had experiences during the post-lockdown period. Study limitations include the discordant perception of risk between first-year students and those in their second and third years, likely due to the inexperience associated with the absence of previous internships. Another limitation was the grouping of students who completed internships in different assistance settings with varying levels of exposure to risk within each focus group. Furthermore, the six-month interval between the internship experience and participation in the focus groups was recognized as another limitation of the study.

**Legends:** CdS: Degree Course; SC: Study Courses; HP: Health Professions; FG: Focus Group; PE: Professional Education; Pt: Physiotherapy; Nur: Nursing; EWPT: Environmental and Workplace Prevention Technician; HPEA: Professional Education



Activity Managers; Distance Learning: DL; PPE: Personal Protective Equipment

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**Anonymization Coding of Students:** i) The first digit refers to the year of study of the student (1st, 2nd, 3rd). ii) The letter code indicates the course of study to which the student belongs: Professional Education (PE), Physiotherapy (Pt), Nursing (Nur), and Environmental and Workplace Prevention Technician (EWPT). iii) The third digit is the code assigned to the student within the Focus Group to ensure anonymity.

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