

Original Communication**COVID-19 PANDEMIC RESTRICTIONS: CHANGES IN ANATOMY LEARNING AND ATTITUDE TOWARDS OWN BODY DONATION AMONG MEDICINE STUDENTS (2020-2021)**

Susana N. Biasutto, Marcos A. Spinelli, Carlos M. Quinteros, M. Milena Viccini, Sofia G. Siemsen, Lucia Eandi, Melisa S. Gonzalez Abad, Matias A. Perea, M. Angeles Teme, Gaston Tarantino, Solange A. Spatzer, Juan P. Novillo, Lucia M. Navarro, Francisco Mondino, Nicolas Longoni, Emilio A. Llorens, Rocio B. Corzo, Milagros L. Begue, Florencia Basta, Luisina Cuadrado

Body Procurement and Donation Program, Faculty of Medical Sciences, National University of Cordoba, Cordoba, Argentina

ABSTRACT

The COVID-19 pandemic affected all activities. In the university, areas with essential practical activity had difficulty compensating it. Among the basic aspects of Health Sciences, Anatomy students suffered from the impossibility of accessing cadaveric material, but also many other resources. The objective of this study was to assess the opinion of the students regarding changes imposed by the pandemic and their attitude towards donating their own bodies. **Material and Method:** A voluntary survey was carried out to students who attended the course in 2020 and 2021, with different levels of restrictions and information regarding donation. There were questions referred to demographic data, importance assigned to bodies for the learning of Anatomy, if they were student-assistants in that period, pandemic training impact, knowledge about the possibility to donate the body and that the Faculty has a program, willingness to obtain more information, collaborate and / or donate the own body. Respondents were divided into 2 groups: a) Group 1, 2021, with sporadic face-to-face activities and information on donation; b) Group 2, 2020, without attendance or information regarding body donation. Results showed great similarity, except that Group 2 had less knowledge of the possibility of donating and the existence of a program, without affecting the will to donate. Also the reasons for not donating were more ambiguous in that group. In addition, some results were compared with similar groups from 2018, showing that the study groups valued cadaveric material less but had a more positive attitude towards donation.

Key words: *Pandemic changes; cadaveric material importance; medical students; body donation willingness*

RESUMEN

La pandemia COVID-19 afectó todas las actividades. En el ámbito universitario, las áreas donde la actividad práctica es esencial se vieron muy complicadas para compensarlo. Entre

las asignaturas básicas de las Ciencias de la Salud, los estudiantes de Anatomía no pudieron acceder al material cadavérico, aunque tampoco a muchos otros recursos. El objetivo de este estudio fue valorar la opinión de los estudiantes respecto a los cambios impuestos por la pandemia y de actitud hacia la donación del propio cuerpo. **Material y Método:** Se realizó una encuesta voluntaria a los alumnos que cursaron en 2020 y 2021, con diferentes niveles de restricciones y de información referida a la donación. Las preguntas se refirieron a datos demográficos, importancia que se asigna a los cuerpos para el aprendizaje de la Anatomía, si fueron ayudantes alumnos en ese período, si la pandemia afectó su formación, conocimiento sobre la donación del cuerpo y que la Facultad tiene un programa, interés en obtener más información, colaborar y/o donar el propio cuerpo. Las respuestas se dividieron en 2 grupos: a) Grupo 1, 2021, con actividades presenciales esporádicas y con información sobre donación; b) Grupo 2, 2020, sin presencialidad ni información referida a donación de cuerpo. Los resultados evidenciaron gran similitud, excepto que el Grupo 2 tenía menos conocimiento sobre la donación y de la existencia de un programa, sin que ello incidiera en la voluntad de donar. También las razones para no donar fueron más ambiguas en ese grupo. Además, se compararon algunos resultados con grupos similares del 2018, mostrando que los grupos en estudio valoraron menos el material cadavérico pero tuvieron una actitud más positiva hacia la donación.

Palabras clave: *Cambios en pandemia; importancia del material cadavérico; estudiantes de medicina; voluntad de donar el cuerpo*

* *Correspondence to: Prof. Dr. Susana N. Biasutto*
subiasutto@gmail.com

Received: 29 October, 2021. **Revised:** 16 November, 2021.
Accepted: 19 November, 2021.

INTRODUCTION

The COVID-19 pandemic, which began in China at the end of 2019 and still continues in 2021, has imposed a new challenge for the world, in which the Health Sciences are greatly affected in professional practice, research and training. Governments imposed restrictions to avoid close contact between people and, within this framework, the vast majority of activities began to take place remotely, appealing to the use of technology (Bond and Franchi, 2020; Dost et al., 2020; Longhurst et al., 2020; Pather et al., 2020; Puljak et al., 2020; Singal et al., 2020; Banovac et al., 2021; Deutschman et al., 2021; Pawlina, 2021; Shahrivini et al., 2021; Singal et al., 2021; Suarez-Escudero, et al., 2021).

Restrictions due to the COVID-19 pandemic in Argentina began on March 20, 2020, a date similar to most countries in the world, but in Argentina universities regular courses had not begun yet. Sanitary measures prevailed and education was relegated. Universities were closed to students, although virtual activities were immediately organized to fit the requirements of academic training. First-year Medicine students had just entered the University and did not even get to know the classroom or the Dissection Room in the Department of Anatomy. Access to patients (for clinical training) and corpses was restricted by biosecurity measures. Institutions, teachers and students were not prepared to face the sudden challenge that presented the pandemic situation. All the parties involved did their best and progressively adapted and improved. In 2021, Anatomy began with small groups and infrequent practical activities.

In the midst of the pandemic, studies to base the creation of the Program for the Procurement and Donation of Bodies destined for university teaching and research were completed (April 22, 2021) and the Committee for the ethical supervision, information and organization of

activities was constituted (Biasutto, 2021). Despite the restrictions, an arduous work began immediately to organize the Program and develop tasks aimed to improve the body donation.

What was the impact and repercussions of the pandemic (which is still ongoing) on students training and body donation? The objective of this study was to assess the opinion of the students regarding the changes imposed by the pandemic and their attitude towards donating their own bodies.

MATERIAL AND METHODS

A qualitative and relational cross-sectional study was carried out, based on an anonymous and voluntary survey, with responses by multiple selection, semi-structured and others with a rating scale of 1 to 5 (Likert type).

The survey was prepared to be carried out online and distributed among medical students, considering 2 different groups due to the pandemic circumstances. **Group 1:** First-year Medicine students, who are currently developing the course, with practical face-to-face activities reduced in duration and frequency, and online theoretical activities. This group was informed about body donation in activities organized by the Committee for Body Procurement and Donation (ProDoCue). **Group 2:** Students of the 2nd year of the career, who studied Anatomy in the most difficult period of the pandemic (2020). They completed the course without having face-to-face activities throughout the year and not having known the Chair and the Dissection Room. They did not receive formal information about body donation prior to the survey (from the responsible entity) as the Program had not been still created and it was not considered as a priority under those circumstances.

	2nd year				1st year				P=
	YES	%	NO	%	YES	%	NO	%	
Know about body donation?	157	75.12	52	24.88	413	92.6	33	7.4	<0,0001
Know there is a program?	133	63.64	76	36.36	432	96.86	14	3.14	<0,0001
Wish more information?	150	71.77	59	28.23	325	72.87	59	28.23	0,7689
Would collaborate with the program?	166	79.43	43	20.57	355	79.6	91	20.4	0,9598
Would donate the own body?	150	71.77	59	28.23	320	71.75	126	28.25	0,9955

Table 1- Assessment of the data referring to the donation of bodies in both groups.

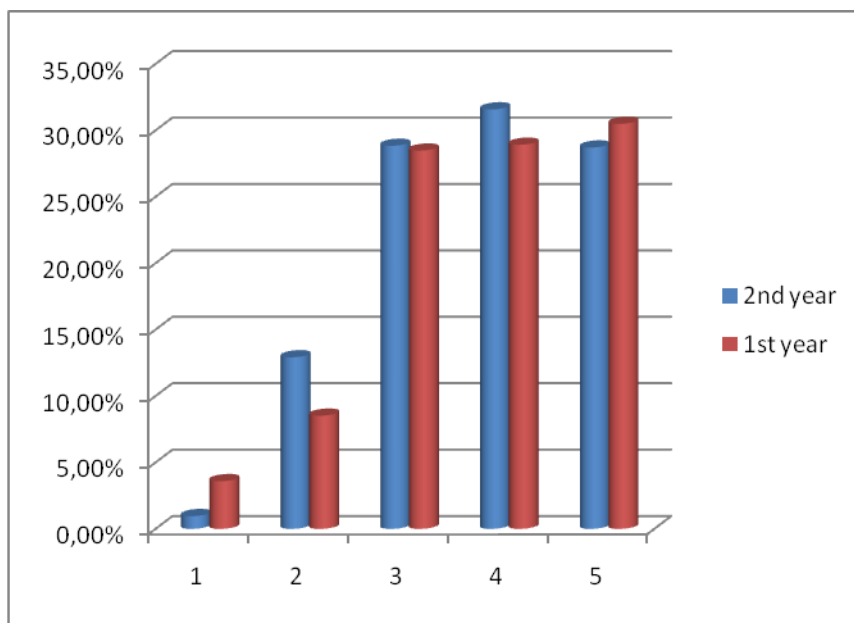
Questions were included about age, gender, nationality, province of origin of Argentines,

religion, year in which they studied Anatomy, year of the career, if they are or were student-

assistants in the Department of Anatomy during 2020-2021, incidence of pandemic restrictions in medical training, knowledge about the possibility to donate the body for teaching and research and the Faculty program for this purpose, interest in getting more information, in collaborating with the donation program and/or donate the own body. For Groups 1 and 2, exclusion criteria consist on having studied Anatomy in a different year than 2021 and 2020 respectively. The limitations of the present study would be related to the group that answered the survey, since it was distributed to all students, but we

cannot assure all received the invitation (they could have changed the e-mail registered in the Department of Anatomy) or the reasons why they answered or not.

Results were reported in percentages or according to a rating scale of 1 to 5, where 1 is "not at all" (does not affect), 5 is "a lot" (affects a lot or all) and the corresponding intermediate values. We consider $P < 0.05$ to be statistically significant. For the analysis of the results, the Chi square test was applied to evaluate the association of qualitative variables. The statistical program used was INFOSTAT.



Graphic 1- Student's assessment of the impact that the pandemic will have on professional practice, where 1 is nothing and 5 is a lot.

RESULTS

Group 1: Four hundred and fifty-five students from this group responded to the survey (response rate 59.79%) of whom 446 fit the inclusion criteria. Three hundred and twenty-eight were women (73.54%) and 118 men (26.46%), 19.55 ± 2.42 years of age (min 16 and max 40). Only 11 (2.42%) were foreigners (Brazil, Chile, Colombia, Paraguay, Peru, USA, Venezuela) and, of the Argentines, 59.54% (259) were from Córdoba and the rest from all the country provinces. Regarding religious practice, 57.62% (257) were Catholic, 5.16% (23) from another Christian religion, 0.22% Jewish and 37% (165) indicated that they did not profess any religion. In this group there were not student-assistants, since a requirement to access this condition is to have passed the Anatomy exam with a high

mark; however 66% of the respondents should be willing to access this position in the future. Ninety-six percent of the students considered bodies are fundamental for teaching-learning of Anatomy and, for 99%, anatomical knowledge was very important for the career. Likewise, they evaluated the modality during the pandemic of very high negative incidence on medical training (88% - sum of Likert values 3, 4 and 5) (Graphic 1). Ninety-three percent of those surveyed knew that the body can be donated, but 97% were informed about the Faculty's donation program. Three hundred and twenty-five students (73%) would be interested in getting more information, 80% (355) would be willing to collaborate with the donation program and 72% (320) would donate their own body (Table 1). Among those willing to donate, there were no differences by geographical origin ($p=0.1173$) considering those

who are not from Cordoba vs Cordobeses, but significant differences were found by gender ($p = 0.0011$) since women were more willing to donate (76% / 60%) and also by religion ($p = 0.0008$), as a higher percentage was evidenced among those who do not profess any religion over Catholics (81% / 68%). In this group, the main reasons for donating were all very altruistic: a) to support teaching-learning (55.63%), b) to be useful (8.44%), c) for teaching and research (5.94%), d) to support research (5%) and e) to help (4.69%). In summary, collaboration for teaching and research (including "science", in general – 3,75%) represented 70,32%. Meanwhile, the main reasons for not donating were quite scattered and unclear: A) for the family (10.32%), B) do not know (8.73%), C) only for transplantation (8.73 %), D) do not like it (7.14%), E) did not answer (7.14%) and F) not yet (5.56%).

Group 2: Two hundred and twenty-one students from this group responded to the survey (response rate 39,22%) of whom 209 fit the inclusion criteria. One hundred and forty-eight were women (70,81%), 60 men (28,71%) and 1 answered "other" (0.48%). Mean age $20,38 \pm 2,16$ (min 18 and max 33). Only 8 (3.84%) were foreigners (Bolivia, Chile, Colombia, Spain, Peru, Venezuela) and, of the Argentines, 60.70% (122) were from Córdoba and the rest from most of the country provinces (except Buenos Aires and Chubut). Regarding religious practice, 55.02% (115) were Catholic, 3.83% (8) another Christian religion, 1.44% (3) Jewish and 39.71% (83) indicated that they did not profess any religion. In this group, 32 were assistant-students. Ninety-four percent of the students considered bodies to be fundamental for teaching-learning of Anatomy and, for 99,52% (208) anatomical knowledge would be very important for their career. Likewise, they evaluated the modality of study during the pandemic of very high negative incidence on medical training (86% - sum of Likert values 3, 4 and 5) (Graphic 1). Seventy-five percent of those surveyed knew that the body can be donated, but 64% were informed about the Faculty's donation program (Table 1). One hundred and fifty students (72%) would be interested in getting more information, 79% (166) would be willing to collaborate with the donation program and 72% (150) would donate their own body (Table 1). Even though this percentage dropped to 69% (123) when student-assistants were excluded and rised to 84% (27) among that group, the difference is not statistically significant ($p=0.0852$). Among those willing to donate, there were no differences by gender ($p=0.8207$), geographic origin ($p=0.4402$) or religion ($p=0.1125$), although a higher percentage of

Cordobeses was evidenced over those from other provinces (75% / 70%) and these who do not profess any religion over Catholics (81% / 66%). In this group, the main reasons for donating were: a) to support teaching-learning (48.67%), b) to be useful (11.33%), c) for teaching and research (7.33%), d) will not serve me anymore (6.67%) and e) to support research (5.33%). In summary, collaboration for teaching and research (including "science) represents 62.66%. Meanwhile, the main reasons for not donating were: A) only for transplantation (20.34%), B) did not answer (20.34%), C) "I do not know" (8.47%), D) for the family (6,78%) and E) "not yet", preference for cremation, disrespect, just not and for religion (5.08%).

Comparison between both groups: In most of the items there were no noticeable differences, including the importance assigned to the bodies for learning Anatomy ($p = 0.0663$) and to Anatomy for the Medicine career ($p=0.1204$), the impact on medical activity caused by the pandemic ($p=0.1255$), the interest in obtaining more information about the donation of the body ($p=0.7689$), the willingness to collaborate with the program ($p= 0.9598$) and the students' attitude towards the donation of their own body ($p=0.9955$). The only variables with a statistical significant difference were the knowledge about the possibility of donating one's own body ($p=<0.0001$) and the existence of the Faculty donation program ($p=<0.0001$). The generic composition of potential donors showed differences between both groups ($p=0.0273$) with an evident female predominance in Group 1. On the other hand, there were no differences by geographical distribution or religion ($p=0.3722$ and $p=0, 4677$ respectively). The reasons for donating and not donating were similar in both groups, although in Group 2 there was a very high percentage that did not respond among those who would not donate.

DISCUSSION

During 2018, two studies were carried out in the same Faculty evaluating similar variables (Biasutto et al., 2019a, b). The comparison of these studies would allow us to evaluate the differences caused by the pandemic and by the knowledge about body donation formally disseminated by the Department of Anatomy. Group 1 of this study was compared with the article published on first-year students in 2018 (Biasutto et al., 2019a), showing that there were no differences in the composition by gender ($p = p=0.0600$), in the proportion of foreigners

($p=0.6853$) and Córdoba's people ($p=0.8992$), and in the distribution by religion ($p=0.1550$). However, the difference was statistically significant in relation to the importance assigned to the bodies and values associated with donation. Even though the importance of the bodies for the learning of Anatomy was very high in the two groups, it was lower in 2021 (Group 1) than in 2018 (96% vs 100% respectively, $p = 0.0136$), but the Group 1 showed greater intention to donate their own body (72% in group 1 vs 49% in 2018, $p=0.0001$), less desire to obtain more information (73% in Group 1 vs 86% in 2018, $p=0.0001$) and greater interest in collaborating with the program (80% vs 71% respectively, $p=0.0057$). The face-to-face activity was not mandatory for Group 1, therefore, some students who do not live in Córdoba did not attend, and could interfere with the importance assigned to the corpse, due to inexperience. It is reasonable that Group 1 showed less interest in getting more information since they had been instructed on the subject and knew the resources to obtain it themselves. On the other hand, the reasons why this group expressed greater willingness to donate and collaborate could be associated to the information or the pandemic (which valued more the research in front of society). What generated this noticeable change of attitude to donation? We observed that both groups assigned similar importance to teaching and research (Group 1 - 70% vs 2018 - 66%, $p = 0.5631$), so we could conclude that the difference in results was due to the information on the topic. Do we rule out the influence of the pandemic? Even if we cannot measure it, but considering the importance students assign to it for learning, we think that the limited access to cadaveric material during this period increased the value assigned to bodies and the need to dispose of them.

Group 2 was compared with students who were in the second year of Medicine in 2018 (Biasutto et al., 2019b). These groups were similar in not receiving formal information on body donation, because Group 2 had no face-to-face activity throughout the Anatomy course and no lectures on donation were scheduled because the Program had not yet been created. Those who were studying in 2018 might only have received some information from their colleagues who worked on the donation project. Both groups did not show differences in the composition by gender ($p = 0.4156$), foreigners ($p=0.3155$) and students from Córdoba ($p=0.0686$), or by religion ($p=0.0849$); determining their similarity. On the other hand, the importance assigned to bodies for the teaching-learning of Anatomy was greater in 2018 (94% -Group 2 vs 99% - 2018, $p= 0.0259$). Group 2 had a better attitude to donate

(72% vs 63%, $p<0.0001$), but less interest in obtaining information (72% vs 83%, $p=0.0249$) and a similar willingness to collaborate in procurement (79% vs 77%, $p=0.5553$) than 2018 students. It was difficult to interpret the results of a group of students who suffered such disruptive circumstances as the COVID-19 pandemic. Not only the lack of knowledge and development of practical skills, but also the experiences of medical students that contribute to their training. Comparatively the results were not bad, however they show contradictions. The variety of circumstances occurred do not guarantee each student to complete the basic knowledge; this survey being only an indirect expression of reality. Why are the students in Group 2 more willing to donate but less desire to acquire formal information and to collaborate? Did they respond conscientiously or are they just trying to cover up their ignorance on the topic? With informative talks, the knowledge deficit about donation can be covered, but the training deficiencies of these students throughout 2020 cannot be easily filled and could cause failure in the career.

Restrictions imposed by the pandemic generated a very negative situation in education, with critical levels in the subjects that require practical training and skill development. Then, the teaching-learning of Anatomy in the Medicine career was one of the areas most affected in the basic period. Regardless of the financial resources of each institution, most of the technological elements that could be most effective for learning were also located in the universities, outside the access of students, during pandemic restrictions. In this context, the majority of students, teachers and universities in different countries faced a similar situation (Bond and Franchi, 2020; Dost et al., 2020; Franchi, 2020; Murlimanju et al., 2020; Puljak et al., 2020; Singal et al., 2020; Banovac et al., 2021; Singal et al., 2021; Suarez-Escudero et al., 2021).

Although many articles were written in relation to the pandemic, most were about the impact of the pandemic on teaching and donation of bodies or the resources developed to facilitate virtual learning, but we could not find any publication that evaluated the perception of students regarding the future impact on their medical training and whether the lack of contact with the corpses would affect their attitude towards donation. So beyond the similarity of circumstances, we have no benchmarks for comparison on these changes in other publications.

In conclusion, the fact that Group 2 students had less knowledge than Group 1 about the possibility of donating and the existence of a program had no impact on the willingness to

donate. Students at pandemic times valued less the importance of learning with corpses in relation to the students of 2018, trying to minimize the importance of their deficit; while they showed greater willingness to donate and collaborate. Thus, we could consider that the circumstances of the pandemic negatively impacted the teaching-learning of Anatomy but favored (specifically the research) the attitude towards body donation regardless of the experience students had with its use.

Conflict of Interest

None

Funding

None

Ethical Approval

Not necessary

Informed Consent

All students were informed about the purpose of the study and only those who voluntarily decided to do so answered the survey.

Contributions

SNB: project management, formal analysis, conceptualization, writing, review and editing, methodology and supervision. MAS: Research and original draft. MQ: Research and original draft. MMV: Research. SGS: Research. LE: Research. MSGA: Research. MAP: Research. MAT: Research. GT: Research. SAS: Research. VSB: Research. JPN: Research. LMN: Research. FM: Research. NL: Research. EAL: Research. RBC: Research. MLB: Research. FB: Research. LC: Research.

ACKNOWLEDGMENT

Authors thank all people who voluntarily donate the own body to the university for teaching and research.

REFERENCES

- Banovac I, Katavic V, Blazevic A, Bicanic I, Hladnik A, Kovacic N, Petanjek Z.* 2021. The anatomy lesson of the SARS-CoV-2 pandemic: Irreplaceable tradition (cadaver work) and new didactics of digital technology. *Croat Med J.* 62: 173-86
- Biasutto SN.* 2021. Creación del programa de procuración y donación de cuerpos de la Universidad Nacional de Córdoba – Argentina. *Rev Arg de Anat Clin* 13: 55-57.
- Biasutto SN, Molina Vargas IE, Weigandt DM, Mora MV, Vargas RAA, Bertocchi Valle AJ, Uanini MF, David OP, Urrutia D, Spinelli MA, Olivera MNJ, Gimenez M, Nefa Salera M, Decouvette A, Ferrero LJ.* 2019a. Reactions of first year medical students in the dissection room, with prosected corpses, and the incidence on own body donation. *Rev Arg de Anat Clin* 11: 18-29
- Biasutto SN, Spinelli MA, Weigandt DM, Mora MV, Bertocchi Valle AJ, Vargas RAA, Molina Vargas IE, David OP, Urrutia D.* 2019b. Attitude of medical students to body donation in the National University of Cordoba – Argentina. *Rev Arg de Anat Clin* 11: 70-83.
- Bond G, Franchi T.* 2020. Resuming cadaver dissection during a pandemic. *Medical Education Online* 26: 1842661. doi: 10.1080/10872981.2020.1842661.
- Deutschman MC, Hyson AR, Seithers LC, Jensen M.* 2021. Teaching Interrupted: How COVID-19 Turned Thoughts into Practice. *J Microbiol Biol Educ* 22 doi: 10.1128/jmbe.v22i1.2613
- Dost S, Hossain A, Shehab M, Abdelwahed A, Al-Nusair L.* 2020. Perceptions of medical students towards online teaching during the COVID-19 pandemic: A national cross-sectional survey of 2721 UK medical students. *BJM Open* doi: 10.1136/bmjopen-2020-042378.
- Franchi T.* 2020. The Impact of the Covid-19 Pandemic on Current Anatomy Education and Future Careers: A Student's Perspective. *Anat Sci Educ* 13: 309–12
- Longhurst GJ, Stone DM, Dulohery K, Scully D, Campbell T, Smith CF.* 2020. Strength, Weakness, Opportunity, Threat (SWOT) Analysis of the Adaptations to Anatomical Education in the United Kingdom and Republic of Ireland in Response to the Covid-19 Pandemic. *Anat Sci Educ* 13: 298–308.
- Murlimanju BV, Agrawal A, Pai MM, Prabhu LV, Prameela MD, Moscote-Salazar LR.* 2020. Reply to: Cadaverless anatomy: Darkness in the times of pandemic Covid-19. *Morphologie* 104: 297-98
- Pather N, Blyth P, Chapman JA, Dayal MR, Flack NAMS, Fogg QA, Green RA, Hulme AK, Johnson IP, Meyer AJ, Morley JW, Shortland PJ, Štrkalj G, 1 Štrkalj M, Valter K, Webb AL, Woodley SJ, Lazarus MD.* 2020. Forced Disruption of Anatomy Education in Australia and New Zealand: An Acute Response to the Covid-19 Pandemic. *Anat Sci Educ* 13: 284–97.

- Pawlina W.* 2021. Effects of Covid-19: The need to assess the real value of Anatomy education. *Anat Sci Educ* 14:129–31.
- Puljak L, Civljak M, Harmina A, Malisa S, Cavic D, Klinec C, Aranza D, Mesaric J, Skitarelic N, Zoranic S, Majstorovic D, Neuberg M, Miksic S, Ivanisevic K.* 2020. Attitudes and concerns of undergraduate university health sciences students in Croatia regarding complete switch to e- learning during COVID-19 pandemic: a survey. *BMC Medical Education* 20: 416-26.
- Singal A, Bansal A, Chaudhary P.* 2020. Cadaverless anatomy: Darkness in the times of pandemic Covid-19. *Morphologie* 104: 147-50.
- Singal A, Bansal A, Chaudhary P, Singh H, Patra A.* 2021. Anatomy education of medical and dental students during COVID-19 pandemic: a reality check. *Surg Radiol Anat* 43: 515-21.
- Suárez-Escudero JC, Bedoya Muñoz LJ, Posada Jurado MC, Arboleda Carmona EP, Urbina Sánchez AJ, Ramírez Burgos S, Bohórquez Gutiérrez CA, Ferreira Morales JL.* 2021. Percepción de los estudiantes sobre adaptaciones virtuales en cursos de anatomía humana por la contingencia SARS-CoV-2. *Academia y Virtualidad* 14: 151-68.