



Revista Bioética

ISSN: 1983-8042

ISSN: 1983-8034

Conselho Federal de Medicina

Gonçalves, Isabela Cristina de Miranda; Sachett, Jacqueline de Almeida
Gonçalves; Santos, Waldeyde O. Magalhães dos; Passos, Shirley Maria de Araújo
Conhecimento e prática universitária no uso de imagens de pacientes
Revista Bioética, vol. 28, no. 3, 2020, July-September, pp. 493-499
Conselho Federal de Medicina

DOI: <https://doi.org/10.1590/1983-80422020283412>

Available in: <https://www.redalyc.org/articulo.oa?id=361570652013>

- How to cite
- Complete issue
- More information about this article
- Journal's webpage in redalyc.org

UABM
redalyc.org

Scientific Information System Redalyc

Network of Scientific Journals from Latin America and the Caribbean, Spain and Portugal

Project academic non-profit, developed under the open access initiative

RESEARCH

Knowledge of the use of patient images at the university

Isabela Cristina de Miranda Gonçalves¹, Jacqueline de Almeida Gonçalves Sachett², Waldeyde O. Magalhães dos Santos³, Shirley Maria de Araújo Passos⁴

1. Departamento de Enfermagem, Escola Superior de Ciências da Saúde, Universidade do Estado do Amazonas, Manaus/AM, Brasil. 2. Programa de Pós-Graduação em Doenças Tropicais e Infecciosas, Escola Superior de Ciências da Saúde, Universidade do Estado do Amazonas, Manaus/AM, Brasil. 3. Centro de Pesquisa e Desenvolvimento, Escola Superior de Ciências da Saúde, Universidade do Estado do Amazonas, Manaus/AM, Brasil. 4. Centro de Especialidades Odontológicas, Escola Superior de Ciências da Saúde, Universidade do Estado do Amazonas, Manaus/AM, Brasil.

Abstract

The use of information and communication technologies in the healthcare area has grown with technological advancements. Through an exploratory, descriptive, cross-sectional and quantitative approach, this study aimed to identify the knowledge and practice of students and professors of a public state university regarding the capture and reproduction of images from patients who have been attended by them. The research had the participation of 200 students enrolled in the dentistry, medicine and nursing courses, as well as 33 professors of these courses. The results show that they care about the ethical and legal aspects underlying the capture, handling, storage and dissemination of clinical images during the teaching and learning process.

Keywords: Ethics. Legislation. Privacy. Photography.

Resumo**Conhecimento e prática universitária no uso de imagens de pacientes**

O uso de tecnologias da informação e comunicação na área da saúde tem crescido paralelamente ao avanço tecnológico. Por meio de pesquisa exploratória, descritiva, transversal e de abordagem quantitativa, objetivou-se identificar o conhecimento e a prática de discentes e docentes de universidade pública estadual sobre captação e reprodução de imagens de pacientes atendidos durante a prática acadêmica. Participaram do estudo 200 discentes matriculados nos cursos de odontologia, medicina e enfermagem, assim como 33 docentes que ministram alguma disciplina do ciclo profissional em qualquer dos referidos cursos. A pesquisa revelou preocupação com aspectos éticos e legais referentes a captura, armazenamento e disseminação de imagens clínicas de pacientes pelos profissionais e estudantes da saúde durante o processo de ensino e aprendizagem.

Palavras-chave: Ética. Legislação. Privacidade. Fotografia.

Resumen**Conocimiento y práctica universitaria en el uso de imágenes de pacientes**

El uso de tecnologías de la información y la comunicación en el área de la salud viene creciendo en paralelo al avance de la tecnología. Por medio de una investigación exploratoria, descriptiva, transversal y de abordaje cuantitativo, se pretendió identificar el conocimiento y la práctica de discentes y docentes de una universidad pública sobre la captación y la reproducción de imágenes de pacientes atendidos durante la práctica académica. Participaron en el estudio 200 discentes matriculados en las carreras de odontología, medicina y enfermería, así como 33 docentes que impartían alguna asignatura del ciclo profesional en cualquiera de dichas carreras. La investigación reveló una preocupación de los profesionales y estudiantes con los aspectos éticos y legales referentes a la captación, almacenamiento y divulgación de imágenes clínicas durante el proceso de enseñanza y aprendizaje.

Palabras clave: Ética. Legislación. Privacidad. Fotografía.

Approval CEP-UEA 3.262.237

The authors declare no conflict of interest.

Information and communication technologies in the healthcare area have been undergoing exponential advancements, prompting discussions about their ethical use. Since healthcare is multi-professional, demanding the sharing of information among several people, ensuring the safety of patient data – especially when it comes to images – has been a marked concern¹.

Many image-sharing technologies, such as social media, have emerged in recent years. This has led to bioethical questions and barriers regarding the publication of patient images and conducts, procedures and techniques that may compromise patient privacy. The Convention on Human Rights and Biomedicine, signed in 1992, aimed to protect patient data, proposing consent as a way to safeguard the subject's integrity².

Article 6 of the *Universal Declaration on Bioethics and Human Rights*³ states that individual autonomy must be preserved, whether in research or prophylactic, diagnostic and therapeutic conducts. Therefore, decisions by group or community leaders or legal representatives do not override individual opinion, and patients can withdraw their consent for any reason and at any time, without being subjected to any prejudice or disadvantage³.

The use of patient data in research carried out in Brazil is regulated by the National Health Council (CNS)⁴. The latter reiterates the precepts of the aforementioned *Declaration*³, establishing informed consent forms (ICF) as mandatory. The signing of this document aims to protect both the participant and the researcher from any potential bioethical issues. In this way, researchers may be authorized to use and disseminate patient images for strictly scientific purposes only with signature of the ICF.

In Brazil, CNS Resolution 510/2016⁴ establishes rules and guidelines for research involving human beings and highlights that consent (obtained from participants able to provide it) and assent (obtained from participants unable to provide consent) are fundamental. However, consent and assent forms refer only to research, not to the clinical use of photographs by professionals in order to publicize or monitor procedures.

Concerning the informed consent process addressed in CNS Resolution 510/2016⁴, the right to authorize the use of images of deceased or absent patients rests with spouses, ascendants or descendants, in agreement with the Brazilian Civil Code⁵. In the case of children, adolescents, people with a mental disorders or people whose

decision-making ability is impaired, health professionals must obtain the legal guardian's authorization. Moreover, whenever possible, participants must provide their assent on the basis of a prior explanation adequate to the participant's capacity to understand.

The principle of respect for privacy is also evident in other national and international ethical and legal provisions. However, studies such as the one carried out by Martorell, Nascimento and Garrafa⁶ reveal that professionals are often unaware of this principle, which leads them to publish images that put them at risk.

Considering the above, this study's conceptual approach assumes that competencies are developed by assimilating knowledge and integrating skills and attitudes into practical work, enabling informed decisions to be made. Therefore, competence is based on three conceptual dimensions: knowledge, attitude and practice^{7,8}.

The first dimension involves being able to remember specific events and applying them to problem solving, as well as understanding them through conceptualization. Thus, generally speaking, the knowledge dimension refers to everything one learns throughout life: in schools and universities, work environments, interpersonal relationships and even from books. Practice, on the other hand, refers to choices in favor of performing specific actions. This process involves psychomotor, affective and cognitive aspects as applied in the social dimension. Thus, when knowledge is employed in daily-life activities, it becomes practical knowledge^{7,8}.

Patient care is individualized, multidisciplinary and seeks to respect each individual's autonomy and uniqueness. However, the ethical and legal precepts governing different health professions are perceived to have weaknesses and distinctions. With the above said, this study aimed to characterize the knowledge and practices of students and professors from public state university in relation to capturing and reproducing images of patients they attended to during their academic life.

Method

This is a cross-sectional, quantitative and descriptive study, carried out using primary data collected via a self-administered questionnaire. We included in the research individuals over 18 years old, regularly enrolled in disciplines of the professional cycles of the dentistry, medicine and

nursing courses at the School of Health Sciences in the city of Manaus, Amazonas, Brazil. As for professors, participants were those who were fully exercising their functions and who taught in disciplines of the aforementioned courses. Those who failed to meet the inclusion criteria were excluded. People of indigenous ethnicity were also not included, since studies involving indigenous peoples require longer execution time, as established by CNS Resolution 304/2000⁹.

The number of students in each course's professional cycle was estimated based on enrollments for the first six-month term of 2019. Sample calculation was performed through Open Epi software, with a 50% anticipated frequency and a 95% confidence interval. We used a structured, self-administered questionnaire encompassing sociodemographic data from students (age, sex, course, undergraduate period and origin) and professors (age, sex, professional category, time since graduation, and complementary formation), in addition to specific questions regarding the studied topic. The interview script employed by Caires and collaborators¹⁰ served as a reference.

Data were collected in April 2019 using Google Forms. Through tablets, a form was individually applied to each participant in the target audience, and this procedure was carried out at the school. The candidates were informed about the study's objectives and, after accepting to participate, accessed the form through their institutional email. The obtained information was presented through descriptive analysis, encompassing all participants and stratifying them into students and professors. We analyzed statistical significance using confidence intervals and, when necessary, a *p* value of 5%.

Results

All the 233 individuals who were approached agreed to participate in the research by signing the informed consent form. Among these, 200 (85.8%) were students and 33 (14.2%) professors. Table 1 shows the data collected from all participating students, among which there was a predominance of females (54.5%) aged between 18 and 25 years (83%). We can also observe a balance in the students' origins (capital city or countryside). Table 2 characterizes the participating professors, among which 75.8% were female, 69.7% had PhD and 45.5% had finished graduation between 10 and 20 years ago.

Table 1. Characterization of students participating in the research (Manaus, Amazonas, Brazil, 2019)

Characteristics	n	%
Sex		
Male	91	45.5
Female	109	54.5
Age group		
18 to 25 years	166	83.0
26 to 32 years	26	13.0
33 to 40 years	8	4.0
Course		
Nursing	42	21.0
Medicine	120	60.0
Dentistry	38	19.0
Academic term		
N/A	34	17.0
4th	30	15.0
5th	32	16.0
6th	23	11.5
7th	20	10.0
8th	27	13.5
9th	30	15.0
10-12th	4	2.0
Origin		
Capital	96	48.0
Countryside	104	52.0

Table 2. Characterization of professors participating in the research (Manaus, Amazonas, Brazil, 2019)

Characteristics	n	%
Sex		
Male	8	24.2
Female	25	75.8
Age group		
30 to 41 years	14	42.4
42 to 51 years	13	39.4
52 to 62 years	6	18.2
Course		
Nursing	15	45.5
Medicine	5	15.2
Dentistry	13	39.3
Time since graduation		
Less than 10 years	4	12.1
Between 10 and 20 years	15	45.5
Between 21 and 30 years	10	30.3
Between 31 and 40 years	4	12.1
Complementary formation		
Specialization	4	12.1
Master's	6	18.2
PhD	22	66.7
Post-doctoral	1	3.0

In terms of questions regarding the object of study (Table 3), when asked whether photographing or filming someone without their prior authorization had legal implications and whether the person's image should be preserved, all professors answered "yes". Among students, 96.5% answered "yes" to the first question and 98% answered "yes" to the second. Concerning the legal

aspects of capturing and using images in Brazil, 101 (50.5%) students and 9 (27.3%) professors did not know that such provisions were present in the Federal Constitution¹¹ and in the Brazilian Civil⁵ and Penal¹² codes. However, 110 (55%) students and 25 (75.8%) professors said that, as a result of their professional code of ethics, they were familiar with specific regulations on the topic.

Table 3. Knowledge and practice regarding the use of images among students and professors (Manaus, Amazonas, Brazil, 2019)

	Question	Answer	Students		Professors	
			n	%	n	%
Knowledge	Do you think photographing or filming someone without their prior authorization has legal implications?	Yes	193	96.5	33	100.0
		No	6	3.0	0	0.0
		I do not know	1	0.5	0	0.0
	Do you think a patient's image should be preserved?	Yes	196	98.0	33	100.0
		No	2	1.0	0	0.0
		I do not know	2	1.0	0	0.0
	Do you know about any provisions in the Federal Constitution, the Civil Code or the Brazilian Penal Code that permit the capture and use of people's images?	Yes	59	29.5	20	60.6
		No	101	50.5	9	27.3
		I do not know	40	20.0	4	12.1
	Are you familiar with any provisions on the capture and use of patient images in your profession's Code of Ethics?	Yes	110	55.0	25	75.8
		No	56	28.0	6	18.2
		I do not know	34	17.0	2	6.0
Practice	Have you ever photographed a patient during your academic activities in the health services?	Yes	72	36.0	23	69.7
		No	125	62.5	10	30.3
		Does not remember	3	1.5	0	0.0
	If you answered "yes," for what purpose?	Education	33	45.8	10	43.5
		Research	12	16.7	1	4.4
		Teaching and research	13	18.1	11	47.8
		Teaching, research and social networks	5	6.9	1	4.3
		Teaching and social networks	5	6.9	0	0.0
		Research and social networks	2	2.8	0	0.0
		Social networks	2	2.8	0	0.0
	How often have you shared footage and/or photographs?	1 time	29	40.3	8	34.8
		2 to 4 times	13	18.1	3	13.0
		More than 4 times	7	9.7	5	21.7
		I do not remember	16	22.2	6	26.1
		I have never shared footage and/or photographs	7	9.7	1	4.4
	Did you ask the patient or guardian for permission to take these images? What kind: verbal and/or written permission?*	Verbal	47	65.3	5	15.2
		Written	16	22.2	15	45.4
		Did not ask	5	6.9	3	9.1
		Blank	0	0.0	10	30.3
		I do not remember	2	2.8	0	0.0
		There was no time	2	2.8	0	0.0

* The participants could choose more than one answer to this question.

When investigating the practical dimension, we found that 72 (36%) students and 23 (69.7%) professors claimed to have photographed a patient

during their academic activities at the health service. Meanwhile, 45.8% of students justified these images on the basis of educational objectives, and 47.8% of

teachers on the basis of research objectives. We also found that images were shared exclusively via apps and social networks, being this practice declared by 2.8% of students.

We also verified that 42 (58.4%) students and 11 (47.8%) professors had already shared patient's images up to four times. As for methods of consent and assent, verbal authorizations (65.3%) was the most prevalent among students, while written authorizations (65.2%) were the most prevalent among teachers. However, 10 professors (43.5%) did not answer this question.

Discussion

In the health field, it is crucial to consider knowledge production, professional formation and services as inseparable elements for the emergence of a new paradigm. Curricular guidelines proposed by the Brazilian Ministry of Health to transform professional training establish that the university must be open to social demands and capable of producing knowledge that is relevant and useful for the development of the national health system¹³.

The technologies currently in use by health professionals place professional training and care practices into a new ethical context. Most people own a smartphone that can be easily used to record images and videos of situations experienced by patients or co-workers in health institutions.

In this sense, patients are increasingly vulnerable to having their images captured when receiving health services – especially those patients whose awareness is impaired. Photographs showing skin lesions, open fractures, injuries and deaths are frequent in scientific publications and social networks¹⁰ (a fact confirmed by the participants of our research).

However, the person who is recording the image often forgets or is unaware that prior consent – by patients or their guardians and by the professional in charge of the case – is a non-negotiable requirement¹⁴. Some of the participants indicated that they had captured images from the clinical environment without asking patients for their permission, demonstrating that this practice is somewhat frequent in academic health training.

Nevertheless, most participants also indicated being aware that in order to comply with ethical principles they had to obtain verbal – or

preferably written – authorization prior to using patients' information or images. The privacy of the ill must be preserved even if they have authorized the use of their information or images, since no one should be unnecessarily exposed. This right is sometimes violated when images of body parts, radiographs and information in medical records are disclosed¹⁵.

It is not possible to prohibit health professionals to access the images of patients' clinical conditions, but using these images abusively and against the will of the involved parties may lead to legal sanctions¹⁶. According to Article 5, item X of the Brazilian Federal Constitution¹¹, one's private life, intimacy, honor and image are inviolable, and victims who have these rights violated are entitled to compensation. Even so, a comprehensive literature review pointed out that ethical and legal weaknesses in the publication of patient images are still common, especially when comparing Brazilian legal determinations to those held by other countries¹⁷.

Moreover, health professionals must be fully aware of the criteria established in their code of ethics¹⁸⁻²⁰. Article 86 of the Brazilian Code of Ethics for Nurses *prohibits nurses from making public references to health cases, situations or facts. They are also not allowed to publicize images that can identify people or institutions – using any means of communication whatsoever, without first having authorization for this*¹⁸. Article 75 of the Code of Medical Ethics¹⁹ prohibits professionals from publishing or sharing patient images; however, the National Health Council⁴ allows their use for scientific purposes as long as this has been authorized with an ICF or consent form signed by the patient or by the patient's legal representative.

On the other hand, the Code of Ethics for Dentists²⁰ prohibits dental surgeons from publishing identifiable images of patients, except with their authorization and for educational and research purposes. Professionals are allowed to disclose selfies in which they are accompanied by patients, as well as images of clinical and dental monitoring, provided that they are the ones responsible for the treatment in question. However, to do so they are still required to obtain prior authorization via ICF.

Some students and professors are aware of the ethical stipulations made by their professional category for the use of patient images. They are also aware that, even if consent has been obtained, certain situations can still lead to negative repercussions. Martorell, Nascimento and Garrafa⁶

found that professionals had counterproductive feelings when confronted with images taken in surgical centers of unconscious patients or in emergency care, where it is often not possible to request prior consent.

In addition to expose shocking images of patients in vulnerable situations, health services weaken themselves before society, demonstrating a lack of confidentiality and reliability. This behavior also has negative impacts on biosafety, since members of the medical team may contaminate their environment – and even the patient – by establishing direct contact after touching their smartphones.

In this sense, the trivialization of care-routine information and records can be assessed through the number of shares and comments made in response to particular episodes⁶. Whatever the plausible arguments to justify such “viralization” of data, such as the need to inform the population, the exposure of patients on social networks must be carefully analyzed. It is prudent for professionals to previously assess the ethical and legal context surrounding this type of disclosure, as well as its possible repercussions.

Final considerations

This study assessed students’ and professors’ knowledge and practices regarding the capture and reproduction of patient images in the academic environment. Our data showed that most participants knew about the legal aspects underlying the use of patient images, and understood that verbal or written prior consent was necessary. Respondents also mentioned the existence of specific legislation regarding this matter.

However, the practice of requiring the ICF from patients has not been widely used in cases that images were taken for teaching and research purposes. The fact that students witness this behavior is a cause for concern, since they may mistakenly regard them as an ethical point of reference. Thus, the ethical and legal principles underlying the use of images for these purposes should be reinforced in academic curricula. The legal implications of this practice for the respect and privacy of patient information have to be emphasized, as well as their impact on the integrity of teaching and healthcare institutions.

References

1. Silva ICS, Prates TS, Ribeiro LFS. As novas tecnologias e aprendizagem: desafios enfrentados pelo professor na sala de aula. *Debate* [Internet]. 2016 [acesso 13 maio 2019];16(15):107-23. DOI: 10.5007/1980-3532.2016n15p107
2. Portugal. Ministério Público. Procuradoria-Geral da República. Convenção para a protecção dos direitos do homem e da dignidade do ser humano face às aplicações da biologia e da medicina: convenção sobre direitos do homem e a biomedicina [Internet]. Lisboa: Ministério Público; 1997 [acesso 22 maio 2019]. Disponível: <https://bit.ly/3eVd0S6>
3. Organização das Nações Unidas para a Educação, a Ciência e a Cultura. Declaração universal sobre bioética e direitos humanos [Internet]. Paris: Unesco; 2005 [acesso 22 abr 2019]. Disponível: <https://bit.ly/2WMLmAm>
4. Conselho Nacional de Saúde. Resolução CNS nº 510, de 7 de abril de 2016. Dispõe sobre as normas aplicáveis a pesquisas em ciências humanas e sociais cujos procedimentos metodológicos envolvam a utilização de dados diretamente obtidos com os participantes ou de informações identificáveis ou que possam acarretar riscos maiores do que os existentes na vida cotidiana. *Diário Oficial da União* [Internet]. Brasília, 24 maio 2016 [acesso 15 jun 2020]. Disponível: <https://bit.ly/30J7U6t>
5. Brasil. Código civil brasileiro e legislação correlata [Internet]. Brasília: Senado Federal; 2008 [acesso 7 maio 2019]. Disponível: <https://bit.ly/39mDnPv>
6. Martorell LB, Nascimento WF, Garrafa V. Redes sociais, privacidade, confidencialidade e ética: a exposição de imagens de pacientes no Facebook. *Interface Comun Saúde Educ* [Internet]. 2016 [acesso 22 maio 2019];20(56):13-23. DOI: 10.1590/1807-57622014.0902
7. Marinho LAB, Costa-Gurgel MS, Cecatti JG, Osis MJ. Conhecimento, atitude e prática do autoexame das mamas em centros de saúde. *Rev Saúde Pública* [Internet]. 2003 [acesso 23 abr 2019];37(5):576-82. DOI: 10.1590/S0034-89102003000500005
8. Leme R. Avaliação de desempenho com foco em competência: a base para remuneração por competências. Rio de Janeiro: Qualitymark; 2006.
9. Conselho Nacional de Saúde. Resolução CNS nº 304, de 9 de agosto de 2000. Afirma o respeito devido aos direitos dos povos indígenas no que se refere ao desenvolvimento teórico e prático de pesquisa em seres humanos que envolvam a vida, os territórios, as culturas e os recursos naturais dos povos indígenas do Brasil [Internet]. Brasília, 11 ago 2000 [acesso 23 abr 2019]. Não homologada. Disponível: <https://bit.ly/2OP7JRh>

10. Caires BR, Lopes MCBT, Okuno MFP, Vancini-Campanharo CR, Batista REA. Conhecimento dos profissionais de saúde sobre os direitos de imagem do paciente. *Einstein* [Internet]. 2015 [acesso 22 maio 2019];13(2):255-9. DOI: 10.1590/S1679-45082015AO3207
11. Brasil. Constituição da República Federativa do Brasil de 1988. *Diário Oficial da União* [Internet]. Brasília, 5 out 1988 [acesso 15 jun 2020]. Disponível: <https://bit.ly/2Ea68n3>
12. Brasil. Decreto-Lei nº 2.848, de 7 de dezembro de 1940. Código Penal. *Diário Oficial da União* [Internet]. Brasília, 31 dez 1940 [acesso 18 ago 2020]. Disponível: <https://bit.ly/2E3R1Mj>
13. Feuerwerker LCM. Educação dos profissionais de saúde hoje: problemas, desafios, perspectivas e as propostas do Ministério da Saúde. *Rev Abeno* [Internet]. 2003 [acesso 3 maio 2019];3(1):24-7. Disponível: <https://bit.ly/3jwETDx>
14. Batista REA, Campanharo CRV, Cohrs CR. Ética e legalidade na era da imagem digital. *Acta Paul Enferm* [Internet]. 2012 [acesso 25 jun 2019];25(5):i-ii. DOI: 10.1590/S0103-21002012000500001
15. Nascimento DB. Análise bioética da utilização de imagens de pacientes em mídias sociais eletrônicas [dissertação] [Internet]. Brasília: Universidade de Brasília; 2016 [acesso 23 maio 2019]. Disponível: <https://bit.ly/2Bn3M38>
16. Pupulim JSL, Sawada NO. Privacidade física referente à exposição e manipulação corporal: percepção de pacientes hospitalizados. *Texto Contexto Enferm* [Internet]. 2010 [acesso 23 maio 2019];19(1):36-44. DOI: 10.1590/S0104-07072010000100004
17. Araújo-Passos SM, Santos WM, Silva GLAT, Gonçalves ICM. The ethical and legal aspects of image publications of patients: an integrative literature review. *J Psychol Clin Psychiatry* [Internet]. 2018 [acesso 19 maio 2019];9(6):705-9. Disponível: <https://bit.ly/2BpSmf3>
18. Conselho Federal de Enfermagem. Resolução Cofen nº 564, de 6 de novembro de 2017. Aprova o novo Código de Ética dos Profissionais de Enfermagem. *Diário Oficial da União* [Internet]. Brasília, 6 dez 2017 [acesso 15 maio 2019]. Disponível: <https://bit.ly/2ZSO6Ot>
19. Conselho Federal de Medicina. Código de ética médica: Resolução CFM nº 2.217, de 27 de setembro de 2018 [Internet]. Brasília: CFM; 2019 [acesso 31 dez 2019]. Disponível: <https://bit.ly/3fVHOMT>
20. Conselho Federal de Odontologia. Resolução CFO nº 118, de 11 de maio de 2012. Revoga o Código de Ética Odontológica aprovado pela Resolução CFO nº 42/2003 e aprova outro em substituição. *Diário Oficial da União* [Internet]. Brasília; 14 jun 2012 [acesso 28 nov 2018]. Disponível: <https://bit.ly/3hVYCBn>

Participation of the authors

All authors contributed equally to this study.

Correspondence

Isabela Cristina de Miranda Gonçalves - Av. Carvalho Leal, 1.777, Cachoeirinha CEP 69065-001. Manaus/AM, Brasil.

Isabela Cristina de Miranda Gonçalves – PhD – igoncalves@uea.edu.br

 0000-0002-3868-6226

Jacqueline de Almeida Gonçalves Sachett – PhD – jac.sachett@hotmail.com

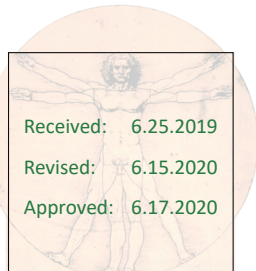
 0000-0001-5723-9977

Waldeyde O. Magalhães dos Santos – PhD student – waldeydemagalhaes@gmail.com

 0000-0001-5101-585X

Shirley Maria de Araújo Passos – PhD – smpassos@uea.edu.br

 0000-0002-1168-4757



Received: 6.25.2019
Revised: 6.15.2020
Approved: 6.17.2020