The importance of scientific information in education for the prevention of viral infectocontagious diseases

A importância da informação científica na educação para a prevenção de doenças infecciosas virais

La importancia de la información científica en la educación para la prevención de enfermedades infecciosas virales

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How to cite: Rodrigues RC, Carvalho ALP, Avelino A, Bessa W, Rodrigues MC. The importance of scientific information in education for the prevention of viral infectocontagious diseases. REVISA. 2020; 9(3): 500-13. Doi: https://doi.org/10.36239/revisa.v9.n3.p500a513

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Received: 20/07/2020
Accepted: 22/09/2020

RESUMO

Objetivo: orientar alunos do ensino fundamental e médio do CED07-Ceilândia / DF sobre a importância das práticas de higiene em prol da prevenção de doenças infecciosas. **Método:** o estudo foi desenhado em três fases distintas: aplicação de questionários de higiene pessoal; palestras e workshops práticos sobre patologias humanas; e avaliação do projeto pelos alunos participantes. **Resultados:** Os resultados mostram que 57% dos alunos compartilham objetos pessoais, um número muito elevado, uma vez que a literatura aponta que existem várias patologias que podem ser adquiridas de objetos individuais. Observou-se também que os alunos não têm o hábito de tirar os sapatos antes de entrar em suas casas. Eles alegaram desconhecer os riscos de contaminação por esse comportamento, mas afirmaram que, após as informações fornecidas pelo projeto, estariam mais atentos a esse fator de contaminação domiciliar. Assim, acredita-se que as práticas educativas e informativas sobre o tema proposto foram relevantes, uma vez que os alunos relataram que aprenderam com as atividades desenvolvidas e estavam dispostos a mudar seu comportamento em relação às práticas de higiene. **Conclusão:** O estudo também demonstra que tais práticas contribuem para a prevenção de doenças por meio de medidas simples, como a melhoria da higiene pessoal, essencial para a saúde pública, uma vez que muitas doenças graves podem ter reduzido o índice de contaminação apenas com orientações educativas. e práticas de higiene corretas.
Descritores: Práticas de higiene; Educação; Doenças infecciosas; H1N1; COVID-19.

ABSTRACT

Objective: to guide students of elementary and high-school levels at CED07-Ceilândia/DF on the importance of hygiene practices in favor of preventing against infectious diseases. **Method:** the study was designed in three distinct phases: application of questionnaires about personal hygiene; lectures and practical workshops on human pathologies; and evaluation of the project by participating students. **Results:** The results show that 57% of the students share personal items, a considerably high number since the literature points out that there are several pathologies that can be acquired using individual objects. It was also noted that students are not in the habit of removing their shoes before entering their homes. They claimed that they were unaware of the risks of contamination through this behavior, but stated that, after the information provided by the project, they would be more attentive to this home contamination factor. Thus, it is believed that the educational and informational practices on the proposed theme were relevant, as students reported that they learned from the developed activities and were willing to change their behavior regarding hygiene practices. **Conclusion:** The study also demonstrates that such practices contribute to disease prevention through simple measures, such as better personal hygiene, which is essential for public health, since many serious diseases can have reduced contamination rate only with educational guidelines and correct hygiene practices.
Descriptors: Hygiene practices; Education; Infectious diseases; H1N1; COVID-19.

RESUMEN

Objetivo: orientar a los estudiantes de primaria y secundaria del CED07-Ceilândia / DF sobre la importancia de las prácticas de higiene a favor de la prevención de enfermedades infecciosas. **Método:** el estudio se diseñó en tres fases diferenciadas: aplicación de cuestionarios de higiene personal; conferencias y talleres prácticos sobre patologías humanas; y evaluación del proyecto por parte de los estudiantes participantes. **Resultados:** Los resultados muestran que el 57% de los estudiantes comparten objetos personales, un número muy alto, ya que la literatura señala que existen varias patologías que se pueden adquirir a partir de objetos individuales. También se observó que los estudiantes no tienen la costumbre de quitarse los zapatos antes de ingresar a sus hogares. Afirmaron desconocer los riesgos de contaminación por este comportamiento, pero manifestaron que, luego de la información brindada por el proyecto, estarían más atentos a este factor de contaminación domiciliaria. Así, se cree que las prácticas educativas e informativas sobre el tema propuesto fueron relevantes, ya que los estudiantes informaron que aprendieron de las actividades desarrolladas y estaban dispuestos a cambiar su comportamiento en relación a las prácticas de higiene. **Conclusión:** El estudio también demuestra que dichas prácticas contribuyen a la prevención de enfermedades a través de medidas simples, como la mejora de la higiene personal, fundamental para la salud pública, ya que muchas enfermedades graves pueden haber reducido la tasa de contaminación solo con pautas educativas. y prácticas de higiene correctas.
Descriptores: Prácticas de higiene; Educación; Enfermedades infecciosas; H1N1; COVID-19.

ORIGINAL

Introduction

Infectious or infectious diseases are characterized by easy and rapid transmission, among individuals, which are caused by infectious agents or their toxins, for example, viruses, bacteria and even protozoa and fungi.[1] The transmission can happen through the respiratory tract and the mouth (nasopharyngeal secretions and expelled saliva), sexual contact, physical contact (handshake, hug, kiss) and sharing of objects that if contaminated can infect humans causing viral infectious diseases such as AIDS, hepatitis, measles, mumps, polio, chickenpox, herpes, rubella, smallpox and different types of flu.[2]

The flu is caused by influenza viruses, which cause acute viral infection of the respiratory tract with high transmissibility, this can be direct when there is a person-to-person contact – droplets expelled by the infected individual during sneezing, coughing or talking – or indirectly by contact with contaminated surfaces or objects.[3] The spread of the virus can be prevented with some hygiene habits such as cleaning benches, personal objects, door handles, computer, cell phones, among others.[4] Therefore, it is of paramount importance to keep a close connection between health and education as it has been considered an important pillar to reach a healthier population. It is not new that the link between health and education is recognized to provide the school community with greater possibilities of access to information. Consequently, this community is provided with the knowledge of formal and informal education concerning human health. In this sense, the school space becomes a fundamental locus for disease prevention and health promotion, as it has represented an important place of confluence for these two converging areas, accommodating extensive possibilities for initiatives such as activities for clinical and social diagnosis; screening and referral strategies to specialized health services or primary care; and health education and health promotion activities, among others.

The school is a privileged institutional area for the encounter of education and health: a space for social coexistence and the establishment of favorable relations for the promotion of health through the perspective of Integral Education.[5] In this context, the Health at School Program (HSP) – locally known by its acronym PSE, in Portuguese – was established in Brazil in 2007 through the decree n° 6,286, which advocates for the articulation between health and educational policies, aiming to develop with students and the school community actions for disease prevention and health promotion in schools (6). The articulation between the school and the Primary Health Care Network is the main characteristic of the HSP, which is configured as the primary strategy to promote access to health services, intersectoral communication and health promotion in the school community.[6]

One of the activities of the HSP is health promotion through the identification of pathologies, as well as their diseases. In this sense, we can highlight some of the central infectious diseases that are common in schools: respiratory airway infections, conjunctivitis, gastroenteritis, chickenpox, meningitis, measles, mumps – all of which are caused by viral or bacterial agents. Thus, health education is one of the ways to combat these infections.[6]

Research shows that an essential strategy for the reduction of these

diseases is hand washing with soap and water, especially after using the bathroom, which helps to reduce cases of diarrheal diseases by more than 42% and cases of respiratory infections by almost 25%.[7-8] Regarding respiratory diseases, the primary intention of the present study was to guide students about viruses, because in the Federal District-DF, there is a high incidence of diseases caused by viruses, mainly the flu.

The Federal District health authorities issued a high mortality warning connected to the influenza virus H1N1 in the state of Goiás, with which the Federal District shares all its borders. The state of Goiás alone registered 41% of all deaths in Brazil caused by the flu. Because of this problematic situation, we decided to develop a project focused on information and guidance around the importance of good hygiene practices against the spread of pathogens (viruses and bacteria), which can have severe consequences for the health of the population. Accordingly, this study aimed to provide the school community with relevant information on pathogens, hygiene practices and the importance of vaccines in reducing infectious diseases.

The present study also emerged from the urgency and importance of transmitting scientific knowledge to the school community. Its initial proposal was to develop a social project that could connect university students to the school community. To this end, a social and research project was developed to enable university students in the undergraduate courses at the Ceilândia Faculty of the University of Brasília (FCE-UnB) to spread their knowledge in elementary and high-school settings. It is noteworthy that the Ceilândia region has hosted, since 2008, one of the *Campi* of the University of Brasília, with courses in Nursing, Pharmacy, Physiotherapy, Speech Therapy, Occupational Therapy and Public Health. Therefore, through workshops and active lectures, the study held the general objective of guiding students and teachers of the Ceilândia Learning Center 07 of the Education Secretariat of the Federal District (SEEDF) on the importance of good hygiene in preventing the spread of human pathologies.

Although this study was developed in 2018, and in that year we were not experiencing the COVID-19 pandemic, the design of this study can be used against the new coronavirus, as it is known that the adequate communication about health in elementary and high-school education settings can be of paramount importance in reducing the spread of pathogens. Thus, we can infer that educational practices can bring favorable results against possible epidemics and even severe pandemics such as the one we face in 2020. In this sense, this study also brings practical evidence for the scientific and academic community of an important didactic tool that can bring scientific knowledge closer to school communities. It allows us to consider that educational practices that can simultaneously reach health professionals, teachers, and students and make them work together to build knowledge and promote health may be essential in the promotion of public health.

Method

Participants and study location

The present study is a case report with the participation of undergraduate students from the Pharmacy course at FCE-UnB, professors from FCE-UnB and

professors from Centro de Ensino 07 in Ceilândia (CED07). Pharmacy students were invited to develop activities at the educational center, as FCE's health center seeks to integrate students into various health promotion, maintenance, prevention, protection, and recovery programs. Thus, students were made aware and oriented to develop pedagogical activities on health. In this context students and teachers sought to plan activities within a scientific nature on viral infectious diseases, and further apply them to students at CED 07. Therefore, the pedagogical activities were programmed in order promote interaction between knowledge obtained at UnB and students at elementary and high-school education level. For that purpose, theoretical and practical activities were programmed by teachers and university students and further taught at CED07.

CED07 is in the QNN 13 area and has 2,615 students enrolled in the morning, afternoon, and evening shifts, 564 in elementary school, 1,097 in high school, 827 students in Youth and Adult Education (YAE) and 127 students enrolled in special education. Although the school has several segments and many enrolled students, the data collection for this study was performed only for students in the 3rd year of High School and the 6th year of Elementary School, with 230 and 141 students enrolled, respectively. Data collection with these two groups occurred because we had free access to the students of the Biology and Science teacher. For other students, other projects were being developed concurrently.

Questionnarie Application

The study was carried out from March to July 2018, lasting 15 weeks. In this period, undergraduate students, under the guidance of their teachers, were directed to the school for the development of practical teaching activities on human health. For this, the study was divided into three distinct phases Figure 1. In the first phase, students were submitted the questionnaire with four questions about their routines at school and at home (Table 1). In the second phase, after the application of the questionnaire, students received an educational intervention through a class and were taught about pathogens and the importance of hygiene practices. In the third and last phase, the results of the questionnaire were evaluated and students behaviors were analyzed before and after they had learned more about hygiene and pathogens.

Figure 1: Sequence of the experimental design with the two phases of the study and description of the activities developed at CED07.
Caption: 1st – Questionnaire application: survey questionnaires were applied to students on individual hygiene practices; 2nd –importance of hygiene practices against pathogens and guidance on making and using alcohol-based gel sanitizers; and 3rd – Project evaluation: evaluation by the students of the activities carried out as part of the study towards learning and behavior change.

A questionnaire on the hygiene habits of students was elaborated, which is explained in Table 1. The purpose of the questionnaire was to conduct an initial survey on information about hygiene practices and have a tool for addressing behavior change among students in relation to their previous hygiene behavior. The questionnaire was answered individually, with no identification of the interviewee and with the help of undergraduate students and supervision of teachers.

Table 1- Survey questions applied to CED07 students on hygiene practices.

QUESTIONNAIRE APPLICATION			
QUESTIONS		**yes**	**no**
A)	Are you in the habit of sharing and/or using your colleagues´objects (earphones, toothbrushes, makeuo, clothes, water bottles, cell phones and others)?	◯	◯
B)	Do you wash your hands after using the toilet?	◯	◯
C)	Do you wash your hands before meals?	◯	◯
D)	When you arrive from the street, do you take off your shoes to go home?	◯	◯

Soon after the questionnaires were applied, the students' responses were analyzed, so that the following steps could be taken according to the information provided by the students.

Educational intervention

In the second phase of the study, called Educational Intervention, educational practices were carried out: *i)* collection of biological material; *ii)* analysis of biological growth in Petri dishes; and *iii)* preparation of information posters and educational lectures, which were carried out by undergraduate students at FCE-UnB. In the third phase of the study, the students provided feedback on the use and importance of the project for learning about hygiene, and human pathologies.

Experimental design

After applying the questionnaires, the experimental design was performed weekly as described in the **Figure 2.**

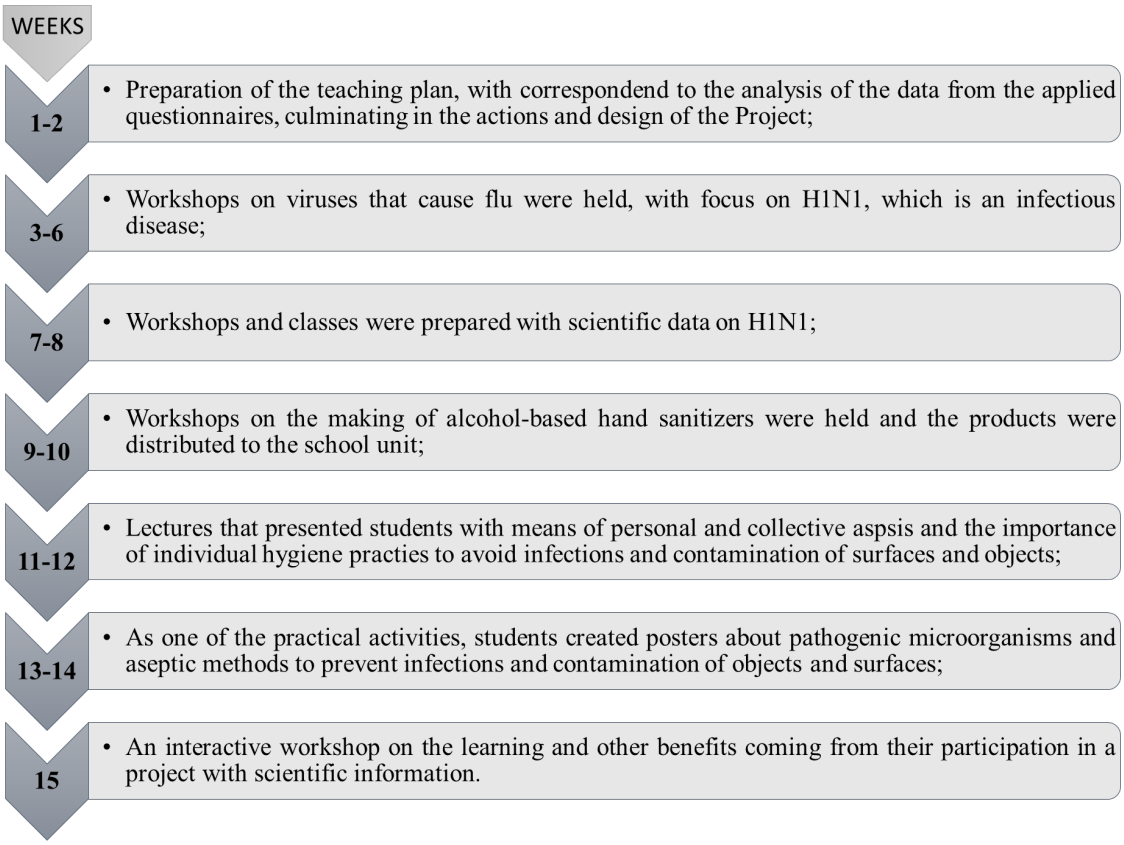

Figure 2- Experimental design applied with students of the CED 07.

Experimental procedure

The Pharmacy students at FCE-UnB participated in workshops and lectures on pathological agents, with an emphasis on viruses. In these activities, they shared biological information in relation to these infectious agents, the form of contagions as well as the diseases they trigger — infectious and contagious. In addition, they were taught about the importance of hand hygiene as well as the correct use of 70% alcohol-based products (liquid or gel). After workshops and educational lectures were ministered, they were taken to the laboratory to learn about the production of a solution containing 70% alcohol.

Guidance on the preparation of alcohol-based hand sanitizer

The proposal for the workshops to produce the 70% alcohol-based hand sanitizers aimed at offering the school setting a safe and effective production, since the Federal District was going through a critical moment against the H1N1 virus — similar to what the territory has faced more recently with the COVID-19 situation —, in which it was necessary to promote this interaction between the scientific knowledge acquired by the students of the Pharmacy Faculty at FCE-UnB and the school community at CED 07. It is worth mentioning that all safety precautions were taken so that there were no accidents. Also, CED 07 in Ceilândia has an independent chemical laboratory that allowed this practice to be carried out. The laboratory is under the responsibility of the school's Chemistry teachers, and students are only allowed

to stay in there, with the presence of such professionals. Besides, the laboratory is equipped with safety devices that were essential for the practice to be carried out.

The preparation of the alcohol-based hand sanitizer is shown in **Figure 3**. Briefly[9], 6 g of Carbopol were weighed in a beaker (1000 mL) 250 mL of sterilized water were added (steps 1 and 2). The solution with Carbopol was left by 24 hours at room temperature (RT) until complete solubilization (step 3). After this period, 750 mL of the Alcohol 96° were added to the Carbopol solution and maintained under agitation until a homogeneous solution was formed (step 4). The neutralizing thickener Triethanolamine was added to the homogenous solution fractioned in 2 mL until 6 mL were reached – to reach a gel-like consistency. The students then measured the final solution pH and adjusted it to approximately 7 (step 5). Glycerin (5 mL) was then added as a humidifier for the solution (step 6). The final step was to transfer the alcohol-based sanitizing gel to the appropriate container. The students who participated in the preparation of the alcohol-based sanitizing gel were appropriately dressed in personal protective equipment (PPE) such as gloves, lab coats, goggles, masks, and caps. It is worth mentioning that all the materials were purchased and donated by a graduate student from the Pharmacy Faculty FCE-UnB.

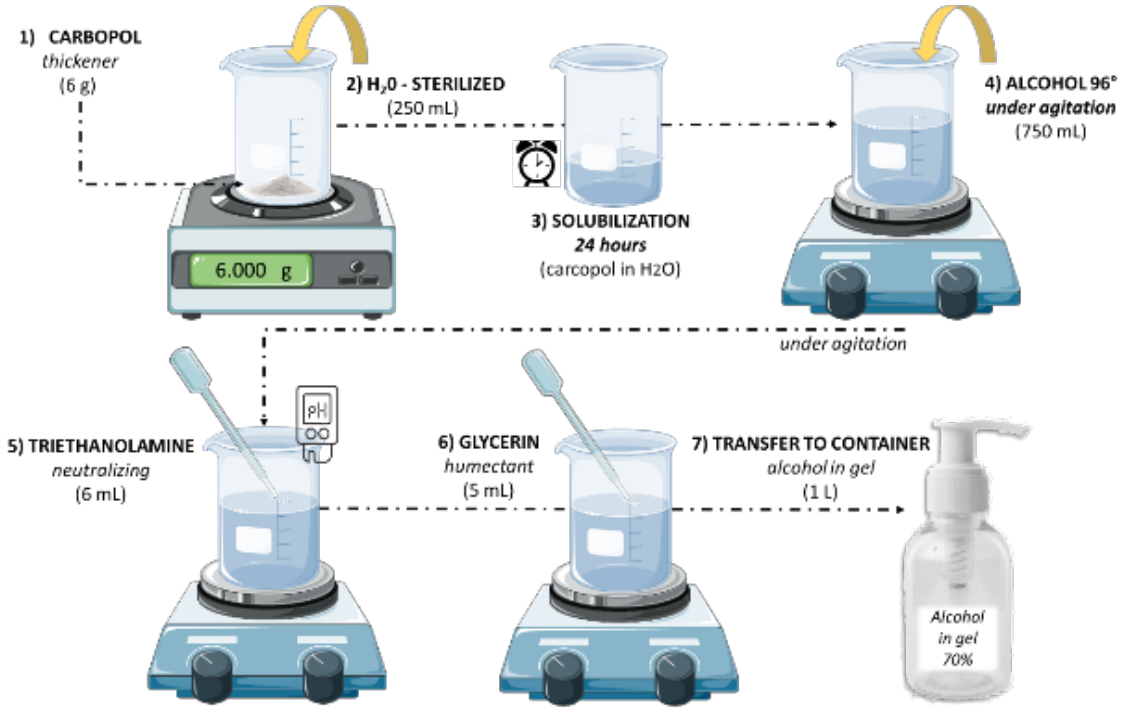

Figure 3- Preparation process of the alcohol-based sanitizing gel **at 70%**
1) Carbopol was weighed in 6 g; 2) 250 mL of sterilized waster were added; 3) Carbopol solution was left by 24 hours at RT until complete solubilization 4) 750 mL of alcohol 96° were added under agitation; 5) Triethanolamine thickener was added in fractions of 2 mL until 6 mL were reached for gel consistency; 6) Glycerin was added as humidifier; and 7) final solution transferred to appropriate container.

Informational workshops

After obtaining the 70% alcohol-based sanitizing gel, CED 07 students were challenged to build informational posters to publicize their work at school and to the neighboring community. For this stage, the students were provided with all the materials needed to assemble the posters - cardboard, pens, pencils, glue, glitter, etc. The idea of this workshop was to reinforce the knowledge passed on to the students as well as to disseminate the importance of this project to all employees, other students, and even beyond the school walls, that is, to the neighboring community. For the creation of the posters, the students had access to didactic materials containing literature around the virus in addition to the support of the students from the Pharmacy course, the teachers and the project coordinator. The posters were displayed in the school premises. In the end, students and teachers built an information booklet to be used in schools and neighborhoods as a didactic tool to guide the community in the adherence to the correct hygiene procedures to prevent infection by pathogens, such as viruses.

Project evaluation by the students

After producing the alcohol-based hand sanitizer, the students from CED 07 were provided with information regarding the importance of studying pathogens and ways of preventing the diseases they trigger. For that, Pharmacy students and FCE-UnB professors ministered classes on the different types of pathogens, ways of contagion, prevention of infections and the main diseases triggered by pathogens. The classes also focused on hygiene as a prevention method, including attitudes such as avoid sharing personal objects. During classes, students were asked all the time about the importance of the above-mentioned topics. Finally, students received another questionnaire with three questions on what they thought about the project (Table 2).

Table 2- Questionnaire applied to students (CED 07) on the application of the project

FEEDBACK OF THE STUDENTS		
QUESTIONS	**yes**	**no**
A) Where there any behavioral changes after participating in the project?	◯	◯
B) Has there any learning about the importance of good hygiene practices to reduces to induce infection by pathogens?	◯	◯
C) Do you approve the teaching method used in the execution of the activities of the project?	◯	◯

Results

Survey of students before educational health practice

Students were asked if they shared personal items, for example, headphones, cutlery, bottles with water, cell phones and makeup. The results reveal that 57% of the interviewed students shared their belongings and/or used those of their colleagues. However, 43% reported not using any shared object (Figure 4A). The results of this study also showed that 96% of the interviewed students practiced hand hygiene after using the toilet, whereas only 4% of them did not have this habit (Figure 4B). When the students were asked about adopting hand hygiene before meals, 83% answered they had the habit of washing their hands before eating food, whereas 17% answered they did not. (Figure 4C). 57% of the student answered they did not remove their shoes before entering home, whereas 43% adopted such preventive measure (Figure 4D).

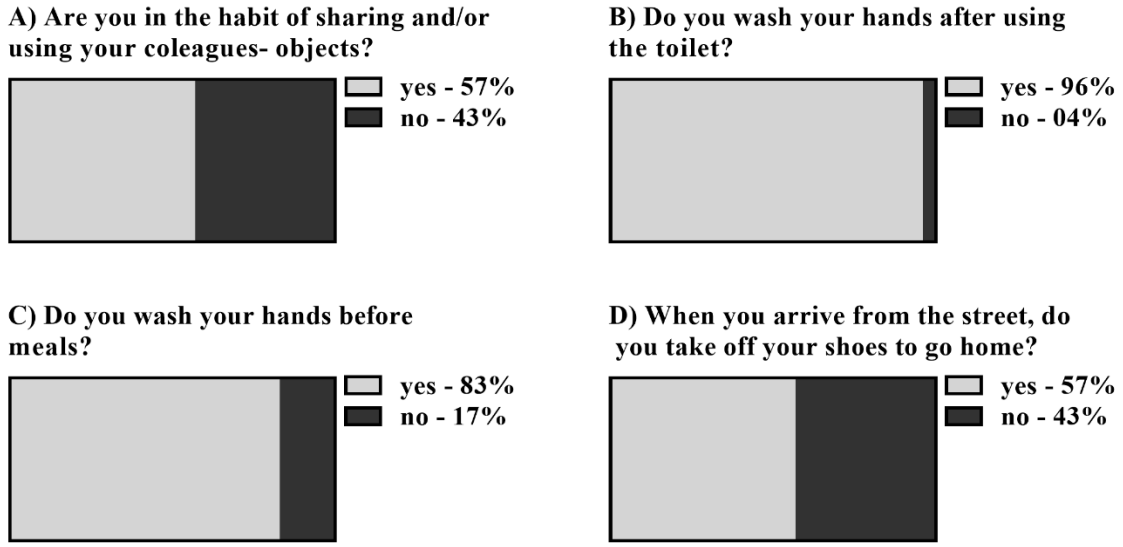

Figure 4: Result of the survey on health practices of CED 07 students regarding sharing the use of objects.
Caption: A) Are you in the habit of sharing and/or using your colleagues' objects (earphones, toothbrushes, makeup, clothes, water bottles, cell phones and others)? B) Do you wash your hands after using the toilet?; C) Do you wash your hands before meals?; and D) When you arrive from the street, do you take off your shoes to go home? Data shown in percentages.

Results of the evaluation of the educational practices according to the participant students

The students from CED 07 were also asked about their learning process through participating in the project, and if they changed their hygiene behaviors after the classes and activities carried out as part of this study. These questions were raised by the Pharmacy students orally. According to the university students, at least 98% of the students participating in the study responded that they were more attentive to new hygiene routines after participating in the study (Figure 5A). According to the CED 07 students, the project helped them to shape new behaviors where they live and encouraged the development of healthier habits.

The study also observed that students from elementary school level also

learned as much through the educational practices offered in the context of this study, since approximately 90% of them reported that they "learned a lot with the information given by the university students" (Figure 5B). The study also noted that elementary school level students understood about the importance of good hygiene practices, as they reported that viruses could be present on various surfaces of objects (door handles, cell phones, shoe soles, personal objects and others) and also in biological secretions (saliva, nasal secretions, etc.). And 94% of these students also demonstrated that they had learned about the importance of adequate hand hygiene, considering their hands an effective vehicle for conducting pathogens that can transmit infectious diseases (Figure 5C).

The results of the evaluation of the project point out that the method was as satisfactory as such: probing the students' previous knowledge, collecting the material, building posters, and conducting lectures on the theme. The participants reported that the method used in the project was important in acquiring knowledge. Furthermore, they described that the project activities were relevant, pleasant, exciting, and highly creative.

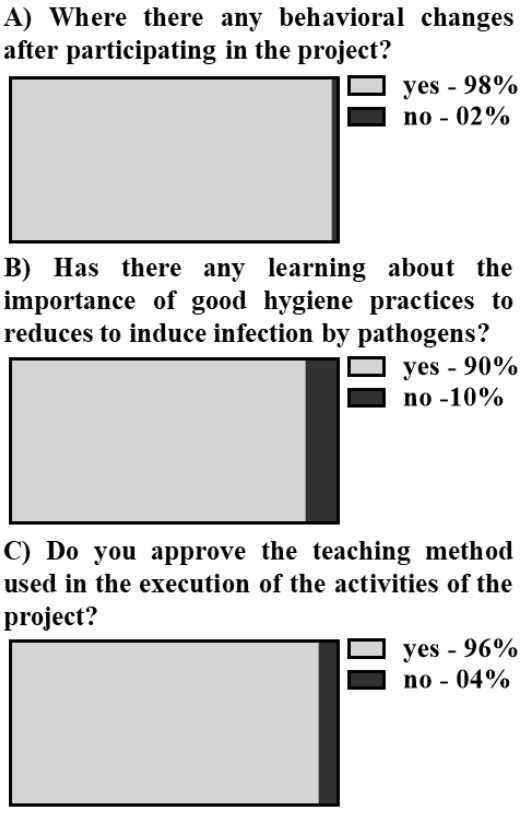

Figure 5: Result of the questionnaire applied to students (CED 07) after the application of the project.
Caption: A) Were there any behavioral changes after participating in the project? B) Has there been any learning about the importance of good hygiene practices to reduce infection by pathogens? and C) Do you approve the teaching method used in the execution of the activities of the project? Data shown in percentages.

Discussion

The viruses are acellular microorganisms that depend on prokaryotic or eukaryotes cells to express their vital activities. Despite the small size of the viruses, impossible to be seen in naked eye, the diseases triggered by them have

already culminated in enormous damage to humanity.[10] Millions of people died as a result of illnesses caused by viruses. Recently, a new coronavirus first diagnosed in China in November 2019, has brought untold havoc around the world to this day: the SARS-COV2 - a mutation in SARS-COV that caused a pandemic affecting 26 countries in the world in 2003.[11-12] However, SARS-COV2 has much more aggressive and contagious characteristics. The acronym SARS refers to Severe Acute Respiratory Syndrome caused by the coronavirus (COV2).[13-16] The disease caused by this virus is COVID-19, which has already affected millions of victims worldwide. According to WHO to date (August 2020).[17] more than 21 million people have been infected with SARS-COV2 and, of that total, the world has registered more than 750,000 deaths. Unfortunately, there is still no vaccine for COVID-19, and the best treatment is still social isolation. As of August 2020, the USA, Brazil, India, and Russia were considered epicenter countries of COVID-19. Brazil was experiencing a pandemic outbreak with over two million people infected and more than 106.000 deaths.[18]

One of the biggest problems faced by Brazil with COVID-19 is related to an excess of misleading and contradictory information about the virus – including a wave of fake news – and about the adequate care and attention needed to avoid contagion. The COVID-19 pandemic has confirmed an important lesson already inherited from the H1N1 outbreak: guiding people to maintain adequate hygiene habits is essential, and science is the leading way for that. Therefore, although they were gathered in 2018, the set of data obtained through this study is in complete convergence with the current moment in which we live in, facing the COVID-19 pandemic and its impacts. The main focus of this study was to demonstrate, through theoretical and practical classes, the importance of personal hygiene habits in the school environment that can prevent the spread of pathogens (viruses, bacteria and fungi) and thus reduce the risks of diseases. This study aimed to guide students and the school community about the influenza virus, primarily H1N1, which has severe consequences for human health.

According to the Federal District Health Secretariat (SES-DF), in 2018, just in the capital of Brazil, 1,439 new cases of Severe Acute Respiratory Syndrome (SRAG) were reported.[19] 85.1% of these patients were identified with H1N1 through laboratory samples. Studies have already shown that some simple measures prevent the transmission of influenza and other respiratory diseases, such as washing and sanitizing hands, especially before consuming any food; not sharing personal items, such as cutlery, plates, glasses or bottles; avoiding close contact with people who show signs or symptoms of influenza; hand washing with water, soap and 70% alcohol after coughing or sneezing; and being vaccinated annually.

These measures are widely publicized by the media, which seek to guide the population about the risks of viruses and how to prevent epidemics with simple personal hygiene measures, which are essential practices in reducing the spread and contamination by viruses. However, there is a need to constantly reinforce these guidelines to the population, as they end up falling into oblivion. This study aims to show that university education can play a fundamental role in society in general, as university students can spread their knowledge to neighboring communities. In this context, elementary and high-school are spaces of paramount importance for the development of health

practices, as mentioned in the introduction of this article, since scientific information adapted to children in elementary school and adolescents in high school can be disseminated to family members, friends, neighbors and other individuals who live with the students.

Educational health practices, which are developed at school must be guided by health campaigns that are contextualized to current problems in order to promote collective behavior change, to avoid contagion by serious pathologies that can affect people and bring serious health consequences.[20] Our results showed that a significant group among the students who participated in this study shared personal objects, such as headphones, cutlery, bottles with water, cell phones and makeup. And it also showed that these habits can be reverted or adapted to better hygiene standards.

The adolescence phase is characterized by significant transformations, both physical and behavioral. During this period, there is also a great need to take care of the appearance and many of them, for example, share makeup. However, the harm caused by its misuse and sharing is mostly unknown by most of these adolescents. According to experts, cosmetics are the focus of bacteria, viruses and fungi, and these microorganisms are responsible for causing various diseases.[21] When shared, eye makeup (brushes, eyeliner, eyelash masks) can transmit conjunctivitis, which is both a viral and bacterial disease. In the case of cosmetics used in the mouth (lipstick, gloss, lip gloss, cocoa butter, among others) their sharing can transmit herpes and chlamydia, being viral and bacterial diseases, respectively.[22-23]

The educational practices developed in this study did not target sexually transmitted diseases. Still, when we developed work with adolescents, these issues are truly relevant to them, so there was curiosity on the part of the students about this essential subject. This issue also concerns the school community and those responsible for these adolescents. Therefore, activities for this exclusive purpose, in line with their age and interest can help prevent several pathologies, from both sexual contact and sharing of intimate clothes. The spread of microorganisms, whether in female or male parts, is responsible for diseases such as trichomoniasis, caused by the protozoan Trichomonas vaginalis, provoking infections in the mucous membranes and in the skin generated by the Human Papilloma Virus (HPV).[24]

Adolescents are considered a group that hardly attend essential health services. Therefore, they need to be targeted by health professionals. In this sense, the HSP program has been considered relevant, as it is able to bring this group closer to public health programs. Usually, the removal from health centers is due, among other things, to the fact that the young people are in good health, due to lack of information and even fear of those responsible for these adolescents. As a result, these students are harmed, as they are part of a population group that does not have necessary monitoring by health professionals, in addition to adequate guidance. For all these reasons, it is possible to consider adolescents as a group susceptible to early pregnancy, sexually transmitted infections (STIs) and other pathologies that can be serious.

Another significant result was the students' report about not knowing the pathologies that can be brought from the streets by their shoes. Many said that they did not take their shoes off before entering home and that they did not realize that they were favoring the entry of pathogens into their home environments. According to researchers at the University of Texas and the

University of Edinburgh, the systematic review of 13 studies observed that shoe soles are vectors for infectious pathogens.[25]

The results of our study also showed that students approved health practices at school, because during the assessment, they demonstrated a change in behavior and stopped sharing personal objects and removing their shoes before entering their homes. Therefore, the school space should be used for health promotion since this is an ideal place for the transmission of information about such issues. Teaching workshops can be a way of providing teaching and learning opportunities, connecting theory and practice, as a form of action in a collective context.[26] For that, they must instigate investigation, action and reflection combining individual with socialized work. Characteristics of practical workshops are thinking, acting, and feeling as elements of activities for the formation and development of knowledge.

Regardless of the type of pathogen, knowing the severe consequences of infectious diseases in the economic, social, and cultural aspects of humanity, demonstrates the clear need for public sectors of health and education to unite in favor of communication and guidance around students' needs in terms of education, on the biological aspects that promote scientific knowledge about viruses that have proven to be extremely so harmful to the society as a whole.

Conclusion

In short, it is possible to consider that the HSP (Health at School Program) allows health professionals to gain more access to the school environment. It is essential that we create a greater connection between health and education professionals, which will certainly provide students with a higher acquisition of health information. Our experience was positive, as we were received by the Educational Advisor and informed of the program since we were unaware of its existence and importance. In this sense, it is essential to promote the dissemination of the program in universities, since they can contribute, in an active and participatory way, with the development of research and extension projects, which may enable more direct and close contact and interaction between higher education intuitions and basic. We also observed that there is a positive reciprocal relationship between the university and basic education since the project provided university students with the opportunity to learn, collect data for scientific research and guide public health for students in basic education. On the other hand, the school community, especially the students, had the opportunity of scientific learning, since they were provided with guidance on pathologies caused by the shared use of personal objects, the risk of pathologies brought by the streets, guidance on good health habits — hygiene among others. Finally, we also believe that health practices in primary education have allowed basic education students to guide the spread and spread of pathogens due to poor hygiene. We believe that this study contributed to the learning and well-being of the students, who reported having learned and enjoyed participating in the active practices performed.

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