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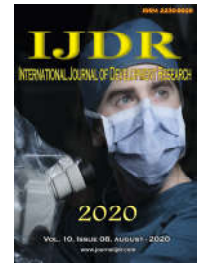
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RESEARCH ARTICLE

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HAND HYGIENE: CARE, TEACHING AND LEARNING PROCESSES FOR CHILDREN

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ABSTRACT

Hands are pathway for the transmission of pathogenic microorganisms and they are mean of transferring from one to another surface through contact with contaminated objects and other surfaces. **Objective:** Guide children from 5 to 8 years of age at Federal Basic Education School in a “Triângulo Mineiro” city in the State of Minas Gerais-Brazil, about the importance of performing proper hand hygiene to prevent and reduce infections, through health promotion at school. **Method:** Quantitative research initially developed by the participant observation and application of a questionnaire previously structured in the school context. **Results:** Male students at the age of seven years were statistically significant ($p > 0.05$) for the risk factor in contracting diarrhea, and also they can be observed as a risk predictor for non-adherence of hand washing after realization of physiological needs. **Conclusion:** The execution of educational actions focused on health promotion can stimulate healthier lifestyle habits and disseminate knowledge about diseases, improving health and promoting quality of life among people.

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INTRODUCTION

In March of 2020, the World Health Organization (WHO) declared a state of a pandemic caused by the new Coronavirus (SARS-CoV-2), who produces the COVID-19 disease, due to the highest rate of contamination and hard fight against the virus. The illness spread mainly by saliva droplets or nasal secretions when a contaminated person coughs or sneezes. Thus, the virus can stay active for some days depending on the weather and the type of material that was infected. To avoid contamination by the virus it's suggested social distancing, hands and surfaces hygiene, and correct utilization of proper masks (KAMPF *et al.*, 2020). Until this moment it's known that children rarely show severe types of the disease, however,

they continue to transmit virus (SAFADI, 2020). In this way, because of the COVID-19 pandemic, the action of hand hygiene receives more attention and has its value reinforced, not only for health professionals but also for population in general, as an effective tool for preventing the disease. According to WHO data, most infections can be prevented by one single measure: to wash hands whenever necessary and to use the correct technique. Therefore, health education should be carried out since childhood, to raise awareness about the importance and need for proper hand hygiene (OMS, 2008). The hands are one of the main pathways for disease transmission because the skin houses several microorganisms that can be moved from one surface to another, through contact with contaminated objects surfaces, in a direct or indirect way (VILARINHO, 2015). The school is a conducive

environment for the exchange of knowledge, as it allows space for emergent reflections, new acquaintance, which results in changing attitudes. In the same sense, there are children, victims of a huge number of infectious diseases, and important agents who are capable of mobilizing and multiplying the correct execution of hand hygiene technique to the formation of this culture (OMS, 2008). In this context, the present study brings results of a research carried out during the practice of the extracurricular internship in the second semester of 2019, with 72 children from 5 to 8 years old, at “Escola de Educação Básica” (ESEBA) in Uberlândia, Minas Gerais, where it was possible to notice the need for guidance from students and the institution’s professional about the significance of hand hygiene. In school practice, it’s notable that isn’t common for children to wash their hands before meals, or after using the bathroom and after playing. Hence, because of the current pandemic situation for the new coronavirus, a simple act like washing hands can prevent COVID-19 and other diseases. Thus, hand hygiene is understood as a simple and cheap individual measure to prevent the spread of infections in general. This study aimed to observe and subsequently guide children from a Federal Basic Education School, in Uberlândia, Minas Gerais, during the practice of non-mandatory extracurricular internship, on the magnitude of performing proper hand hygiene to prevent and reduce infections through health promotion in schools.

MATERIALS AND METHODS

This is a descriptive quantitative and qualitative research achieved at Federal Basic Education School in the city of Uberlândia (MG) during the second semester of 2019. Initially, it was given for students and professors one guidance on the main objectives of the research, how would be its method and invitation to participate in the research. Those who accepted the process signed “Termos de Consentimentos Livre e Esclarecido (TCLE). It was opted for an experimentation activity in concrete intelligible language to children to problematize hand hygiene. The material used was a box with a black light device and fluorescent gel, plus water and liquid soap. The gel was applied in the hands of children, who should remove it through hand hygiene to demonstrate concepts such as microorganisms and to promote self-reflection about the effectiveness of proper hand hygiene and their reduction. After that process, the correct technique for hand hygiene with soap and water, also the time needed to perform it, was presented: measured in several studies of 40 to 60 seconds (BRASIL, 2020). Furthermore, the students put their hands on the black light box, which showed remnants of gel from inadequate hygiene. Then educational leaflets were distributed and adhesive boards were fixed at the hand washing points, containing the step-by-step technique of hand hygiene with water and liquid soap, according to the National Health Surveillance Agency (BRASIL, 2020). Finally, as a way to appraise if students and professionals learned how to properly wash their hands, a semi-open questionnaire was produced. It is a script for an interview, with information on age, sex, education, and questions about hand hygiene. Children asked for help from family members to answer the questionnaire. Students were included to participate in the experimental intervention by parents who signed the “Termo de Consentimento Livre e Esclarecido” (TCLE) and authorized their children to do it. Those who declared any type of allergy with the materials used to execute the activities and children’s parents who did not sign that term were excluded from the

research project. Likewise parents or guardians of minors, who did not authorize them to participate in the investigation, had a complete exclusion in the examen. Initially, 165 students from the early years of elementary school, literacy, were invited, with 72 being accepted, 30 of them were male and 42 were female. Teachers, technicians, and other school employees were not included. Data were collected from the analysis of individually structured questionnaire applied to the participants of the research. The participant’s positive or negative response (oral and corporal) was also observed after the second insertion of the hands in the black light box, concerning the process comprehension of proper hand hygiene and practical perception of its effectiveness. Moreover, this project was submitted to analysis and evaluation by the “Comitê de Ética em Pesquisa” (CEP) of the Federal University of Uberlândia, with authorization number 3.623.101, following Resolution 466/12 of the “Conselho Nacional de Saúde do Ministério da Saúde”, to ensure the ethical aspects of research such as beneficence, harmlessness (physical, moral, spiritual, loss of privacy, time, financial), respect for human dignity and privacy. The statistical analysis to determine the significance of the main risk factors for non-adherence of hand washing, were the χ^2 test (Mantel-Haenszel meta-analysis) for comparison between the variables, Fisher’s exact test for the variables with n less than or equal to 5 and Student’s t-test for quantitative variables, using the Epi Info Software version 2000 program (CDC, Atlanta), and, regarding the significant variable when p-value is less than or equal to 0.05 ($p \leq 0.05$). Data were managed in electronic spreadsheets in the Microsoft Office Excel® 2007 Program by the researchers; either validated for consistency conference and were found differences according to the original questionnaire. Thus, it was analysed.

RESULTS

The study included the analysis of hand hygiene in the second semester of 2019, in a children’s assemblage which was divided into subgroups of five members for hand hygiene activities. In the form of debates were asked students how, when, why and the importance of hand washing. Soon after the deliberations, the fluorescent gel was distributed in the children’s hands. They had to remove it using the usual hand hygiene, and then the students placed their hands in the black light box to evidence remaining gel from the inadequate hygiene. They also worked with the illustration of “microorganisms” concepts and the promotion of self-reflection about the ineffectiveness of inadequate hand hygiene in reducing the agents that cause infection. Besides, after the process, the appropriate technique for hand hygiene with water and liquid soap and the time required to perform it were presented. The results of these hand hygiene actions with students, who have belonged to the research, are referenced in Table 1, as described in the reports of possible symptoms of not hand hygiene, with emphasis on diarrhea. It is observed that 09 male students at the age of seven years ($p > 0.038$) were statistically significant for the risk factor of contracting diarrhea, and at the same time, it is remarkable as a risk predictor for non-adherence to appropriate hand hygiene. The reasons for diarrhea were varied in the male and female groups, with food poisoning (14.7%), symptoms of viruses (20.4%), to eat a lot of sweet (12.8%), poor hands hygiene (19.5%) and 93 unanswered forms (56.3%). As a consequence of possible diarrhea, it was statistically significant for the univariate the fact of not going to class for 3 days ($p = 0.042$).

Table 1: Association of response with reporting of possible symptoms of diarrhea and lack of hand washing in students

Age	Male N = 30(%)	Female N = 42(%)	pvalue
6 years	4(13,3)	5(11,9)	0.605
7 years	9(30,0)	23(54,7)	0.038
8 years	5(16,6)	3(7,1)	0.187
Foodpoisoning	3(10,0)	2(4,7)	0.342
Viruses	4(13,3)	3(7,1)	0.315
Disease	2(6,6)	4(9,5)	0.508
Exaggeration in thesweet	1(3,3)	4(9,5)	0.300
No handhygiene	3(10,0)	4(9,5)	0.623
Neverhad	7(23,3)	11(26,2)	0.784
Do notknow	6(20,0)	12(28,6)	0.410
1 day	2(6,6)	5(11,9)	0.376
2 days	3(10,0)	7(16,6)	0.327
3 days	5(16,6)	1(2,4)	0.042
4 days	1(3,3)	2(4,7)	0.633
1 week	2(6,6)	0(0,0)	0.170
No day	9(30,0)	18(42,8)	0.269
Do notknow	4(13,3)	5(11,9)	0.565

Source: The Author

Table 2. A report in which moments the students perform hand hygiene before and after daily acts

Age	Male N(%)	Female N(%)	pvalue
Before a meal			
6 years	5(16,6)	6(14,2)	0.516
7 years	11(36,6)	23(54,7)	0.132
8 years	4(13,3)	4(9,52)	0.614
After a meal			
6 years	1(3,3)	3(7,1)	0.443
7 years	4(13,3)	16(38,9)	0.021
8 years	3(10,0)	3(7,1)	0.491
Beforeusingthebathroom			
6 years	0(0,0)	1(2,3)	0.583
7 years	2(6,6)	7(16,6)	0.089
8 years	0(0,0)	0(0,0)	Nd
Afterusingthebathroom			
6 years	7(23,3)	5(11,9)	0.446
7 years	10(33,3)	25(59,5)	0.029
8 years	5(16,6)	4(9,5)	0.291
Beforedoinghousework			
6 years	3(10,0)	3(7,1)	0.491
7 years	3(10,0)	12(28,5)	0.057
8 years	2(6,6)	2(4,7)	0.556
Afterdoinghousework			
6 years	1(3,3)	3(7,1)	0.443
7 years	3(10,0)	11(26,1)	0.089
8 years	0(0,0)	59(11,9)	0.060
Beforeplayingwithclassmate			
6 years	2(6,6)	2(4,7)	0.556
7 years	2(6,6)	9(21,4)	0.080
8 years	1(3,3)	0(0,0)	0.416
Afterplayingwithclassmate			
6 years	2(6,6)	5(11,9)	0.376
7 years	9(30,0)	15(35,7)	0.614
8 years	4(13,3)	4(9,5)	0.443
Beforeplayingwith animal			
6 years	0(0,0)	1(2,3)	0.416
7 years	2(6,6)	1(2,3)	0.374
8 years	1(3,3)	1(2,3)	0.663
Afterplayingwith animal			
6 years	4(13,3)	4(9,5)	0.443
7 years	7(13,3)	13(30,9)	0.479
8 years	4(13,3)	3(7,1)	0.315
Before a stroll in the mall			
6 years	2(6,6)	3(7,1)	0.657
7 years	2(6,6)	4(9,5)	0.508
8 years	2(6,6)	3(7,1)	0.657
During a stroll in the mall			
6 years	2(6,6)	4(9,5)	0.508
7 years	6(20,0)	16(38,0)	0.102
8 years	1(3,3)	1(2,3)	0.663

Source: The Author

Table 2 describes the instant that students, in day-to-day acts, perform hand hygiene. It was observed in the moments after eating ($p = 0.021$) and after going to the bathroom ($p = 0.029$) failure of hand hygiene at the age of seven. On other occasions, mainly to perform a daily task, the concern is to wash hands in students who are 7 years old. On the other hand, the female gender does hand hygiene more than male, this may reflect on the possible consequences of not being affected with infectious diseases anymore.

DISCUSSION

In Brazil, at the beginning of the 20th century, parasites disease were considered serious public health problems, regarding sanitation services, the country had an agricultural economy, with rural characteristics basically. There were few cities in the interior of the country with deficient basic sanitation. Few households had piped water, sewage, electricity, street paving, and garbage collection. After the industry expansion there was a rural exodus, which significantly affected the urban structures. In this sense they already had deficiency and lacked strength, thus the sanitation system had increased its use through the disproportionate way, fact that result in permanence of parasites disease. These infections have mainly affected children, resulting in a decrease in physical and mental development. The signs and symptoms caused by these parasites are varied according to the species and the quantity of them, being asymptomatic in some period (SILVA *et al.*, 2018). Gomes *et al.* (2016) point out that these infectious diseases are directly related to the environment in which people live, work, and have their other circumstances. In this social and environmental determination, it is possible to highlight the lack of basic sanitation, hygiene conditions, low family income, cultural aspects and low level of education. Finally, among these context, there are parasitic diseases like caused by helminthes and protozoa, and their transmission is closely related to the geominetic cyclic triad (oral, fecal and soil). Thus the only way to stop this cycle is through hand hygiene. In 2009 the WHO did a worldwide publication to avoid infections. This appeal directly impacted bacterial indexes in the community and the hospital.

The worms that most attack the population in general are: a) *Ascarislumbricoid* that is transmitted through the ingestion of parasitic infective eggs, coming from the soil, water or contaminated food with human feces and b) *Taeniasolitarium* and *Taeniasaginata*, or teniasis, which is transmitted by impure food as contaminated legumes and fruits, infected water, ingestion of raw and undercooked pork or beef, and also spread through hands that have dirt and deficiency in hygienic care (TOLEDO *et al.*, 2018). Other infectious diseases transmitted through the hands are those caused by viruses, especially Rotavirus, mainly affecting children and the population of immunocompromised individuals. They are characterized by gastroenteritis, associated with persistent vomiting and diarrhea, acute abdominal pain and mild fever. Prolonged symptoms last 4 to 8 days. This illness is associated with ingestion of contaminated raw food ready for consumption and contaminated water, beyond to hands with contamination of fecal waste (INSTITUTO DE HOSPITALIDADE, 2000; MOTARJEMI *et al.*, 1997). Among the diseases caused by bacteria of fecal origin stands out the mesophilic, especially fecal coliforms. Therefore, we have *Escherichiacoli*, which causes disorders in the urinary and gastrointestinal tract. Contamination by fecal bacteria is

related to unsatisfactory hygiene habits and ingestion of contaminated food causing diarrhea and cystitis. If it has not interventions, bloodstream diseases can appear and lead the person to death (MOTARJEMI *et al.*, 1997). As infectious and contagious diseases are transmitted mostly through respiratory or oral/fecal pathways, in this research it is noted that students aged seven years are more likely to become infected, because they were the ones who had vulnerability for non-adherence to hand hygiene. This reality is important for the acquisition of viral diseases, and nowadays, SARS-COV-2 (COVID-19) presents itself as the main infectious agent of the nasal and oral mucosa. Withal, it causes an impact on the world economy and on the way of relating between people over the world. In Brazil, the first confirmed positive case of COVID-19 was of a man on February 26, 2020, in São Paulo, 61 years old, who was in Italy (BRASIL, 2020), and the first confirmed death in the country was of a man on March 17 (2020), 62-year-old, with chronic diseases such as diabetes and hypertension (BRAZIL, 2020). On the 5th of August 2020 it was close to 100 thousand deaths, reaching the impressive number of 2.5 million infected Brazilians, and 100 million infected people around the world. There is an urgent need for changes related to the habits of the population in general. The appearance of the first cases of COVID19 showed a warning about the magnitude of hand hygiene to combat the spread of the virus. However, there must be awareness that such behavioral habits should become the routine for everyone. Beyond that, promoting preventive actions several other pathologies, viral, bacterial and parasitic tend to decrease contamination and infections. Thereupon, the school space is a conducive environment for the exchange of knowledge, as it allows birth for reflection, with the emergence of new knowledge that results in changing attitudes (CARRARO, 2004). Children are not only the main causes of infectious diseases but also potent mobilizers and multipliers for the culture formation. That is why it is essential to invest in awareness through health education since childhood, to understand the importance and the value of hand hygiene in its correct form.

Conclusion

An important factor in the human being's life is body hygiene because it improves appearance, increases self-esteem and helps in the prevention of various infectious diseases. Thus it is necessary to create educational projects to value the hygiene of the population, and as a consequence, to eliminate or reduce these infectious diseases (GIATTI, 2004). So health education must be effective with knowledge exchange in the population, which raises the health-disease process and illness control (CARRARO, 2004). Several factors contribute to parasitic, bacterial, and viral diseases. School-age child population, for example, represents an age group that most multiplies diseases, making the school an important space to relate health and education (AULAER *et al.*, 2018). It's concluded that the accomplishment of educational actions, with the focus on health promotion, stimulates healthier lifestyle habits, disseminates knowledge about diseases, improves health and promotes quality of life among people. Therefore those projects like the one developed in 2019 has its importance, because this group of participating children had the opportunity to experience, reflect and to study about the theme. They could modify their attitudes towards personal hygiene as well, before this subject becomes a global issue with Covid-19 pandemic. After this moment of a health crisis,

similar actions are indispensable. Consequently the social relevance of this work.

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