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ORIGINAL

Level of knowledge about handwashing for disease prevention among sixth and seventh grade students at CADE, Santo Domingo

Nivel de conocimiento sobre el lavado de manos para la prevención de enfermedades en estudiantes de sexto a séptimo grado del CADE, Santo Domingo

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ABSTRACT

Handwashing is a fundamental practice for preventing infectious diseases, especially among school-age children. This research aims to assess the level of knowledge about handwashing among sixth- and seventh-grade students at CADE, Santo Domingo, in 2024. A quantitative, descriptive, and cross-sectional study was conducted. The population consisted of students from the Unidad Educativa Adventista del Ecuador (UEPA CADE), from which a representative sample of 55 students was selected through simple random sampling. A structured questionnaire was used as the data collection instrument. The results showed that although most students recognize the importance of handwashing, there are deficiencies in the proper technique and recommended frequency. It is concluded that educational strategies need to be reinforced to improve knowledge and practice of handwashing among this population to reduce the risk of diseases.

Keywords: Hand Hygiene; Health Education; Infections; Prevention; School Health.

RESUMEN

El lavado de manos es una práctica fundamental para la prevención de enfermedades infecciosas, especialmente en niños en edad escolar. Esta investigación tiene como objetivo evaluar el nivel de conocimientos sobre el lavado de manos en niños de sexto a séptimo grado del CADE, Santo Domingo, durante el año 2024. Se realizó un estudio de tipo cuantitativo, con un diseño descriptivo y transversal. La población estuvo conformada por estudiantes de la Unidad Educativa Adventista del Ecuador (UEPA CADE), de los cuales se seleccionó una muestra representativa de 55 estudiantes, mediante muestreo aleatorio simple. Se aplicó un cuestionario estructurado como instrumento de recolección de datos. Los resultados evidenciaron que, aunque la mayoría de los estudiantes reconoce la importancia del lavado de manos, existen deficiencias en la técnica adecuada y la frecuencia recomendada. Se concluye que es necesario reforzar estrategias educativas para mejorar el conocimiento y la práctica del lavado de manos en esta población, con el fin de reducir el riesgo de enfermedades."

Palabras clave: Educación en Salud; Higiene de Manos; Infecciones; Prevención; Salud Escolar.

INTRODUCTION

The problem of poor hygiene practices continues to be a significant threat to public health, especially for young children, who are vulnerable to preventable infectious diseases. Globally, remarkable progress has been

made in reducing child mortality, with a 51 % decline in the death rate among young children since 2000, mainly due to improvements in disease prevention through pneumonia vaccination and nutrition programs.[1] However, serious disparities in access to quality health services persist, leaving many children exposed to respiratory infections and diarrheal diseases.

According to data from the United Nations[2], "The number of children who die before reaching the age of five reached a historic low of 4,9 million in 2022, representing a 51 % decrease since 2000 thanks to sustained efforts by governments and global organizations, in collaboration with health workers and midwives". Despite this, deaths caused by respiratory infections and diarrheal diseases persist, representing the leading causes of years of life lost in childhood. These diseases reflect inequalities in access to basic health services and underscore the importance of implementing educational programs focused on improving these practices.

In Ecuador, the situation of children aged 9 to 12 is no less alarming. Despite the efforts made, problems such as intestinal parasitosis affect 85,7 % of minors, which is one of the main consequences of poor hygiene practices.[3] In addition, 27 % of children under two years of age in the country are malnourished, an indicator of lack of access to essential resources such as drinking water and health education. According to data from the Ecuadorian Ministry of Public Health (MSP), contaminated water and the absence of adequate handwashing practices contribute to the prevalence of acute diarrheal diseases, with critical cases reported in regions such as Chimborazo, where the incidence of diarrhea reaches 50 % in certain localities.[4]

At the local level, in the province of Santo Domingo of the Tsáchilas, a study of healthcare personnel at the Santa Anita General Hospital found that poor hygiene practices among both individuals and healthcare workers are insufficient, which directly affects the most vulnerable communities. A shortage of materials and poor health education limit knowledge about the importance of handwashing as an essential strategy for preventing infectious diseases. In this context, the present project, entitled "Nursing intervention aimed at promoting handwashing practices for the prevention of infectious diseases in sixth and seventh grade children at the Adventist Educational Unit of Ecuador (CADE)," seeks to address these issues through a specific intervention that responds to the needs of this school population.

This study is relevant because it seeks to contribute to the strengthening of public health by promoting healthy habits in sixth and seventh grade children, with a focus on handwashing as an essential practice for reducing the incidence of infectious diseases. The implementation of this intervention not only seeks to improve hygiene awareness among schoolchildren, but will also reduce the risks associated with poor health conditions in the educational environment. The research question guiding this study is: What is the level of knowledge about handwashing in disease prevention among sixth and seventh graders at CADE, Santo Domingo, in 2024?

General Objective

To measure the level of knowledge about handwashing among sixth- and seventh-grade students at the Unidad Particular Adventistas del Ecuador, Santo Domingo, in 2024.

METHOD

Type and Design of the Research

This study took a quantitative approach, since the collection and management of information derived from the application of the instrument is subjected to numerical data analysis to answer research questions, test hypotheses, and establish behavior patterns using statistical methods, based on a logical and deductive scheme, generalizing the results with representative samples.

This approach is appropriate because it allows for objective and measurable results, which is essential for assessing the level of knowledge about handwashing among children in 6th and 7th grades at UEPA CADE, in order to better focus on promoting it. Likewise, this analysis facilitates the statistical comparison of results, which supports the validity of the conclusions and contributes to evidence-based decision-making.

In accordance with its purpose, the research was basic in nature, as it was aimed at generating theoretical knowledge about the level of knowledge about handwashing among 6th and 7th grade children at UEPA Santo Domingo. Its main purpose was to understand the factors that influence the acquisition of hygiene habits, without directly intervening in the population studied. Although its findings may serve as a basis for future health promotion strategies, the immediate objective of the research was not to apply its results in a practical context, but rather to provide relevant information for the development of new research and educational programs.

In terms of the scope of the research, it was descriptive in nature, as it sought to characterize the handwashing practices currently practiced by 6th and 7th grade children at UEPA CADE and to document the changes generated by this intervention. Descriptive studies are essential in this context, as they provide an accurate picture of the state of hygiene practices, thereby identifying patterns and trends that can serve as a basis for future actions. This level of research is key to establishing a detailed initial diagnosis and evaluating the results after an intervention.

In terms of design, the research falls within a non-experimental design, as no variables were manipulated; rather, the level of knowledge about handwashing among 6th and 7th grade children at UEPA CADE was observed and analyzed. This design allowed for the collection of information without directly intervening in the population or conducting an experiment with control or treatment groups. It was based on the observation of existing knowledge and its relationship with contextual factors, which allowed for the collection of relevant data for future educational strategies in hygiene and disease prevention.

According to the research source, it is longitudinal in nature, since in handwashing in children, hygiene practices are observed and recorded over time to assess the evolution of these habits and their impact on children's health. It also allows for the analysis of adherence to hygiene recommendations, the identification of factors that affect consistency, and the examination of the relationship between handwashing and the incidence of disease. By monitoring children for months or years, variables such as the frequency of washing and the technique used are evaluated, which helps to design effective strategies to promote healthy habits and prevent disease used, which helps to design effective strategies to promote healthy habits and prevent disease.

This design is appropriate for the research context because the longitudinal study allows researchers to follow their subjects in real time. This means that they can better establish the actual sequence of events, allowing them to understand cause-and-effect relationships, as well as enabling repeated observations of the same individual over time. This means that any change in the outcome variable cannot be attributed to differences between individuals.

Population and sample

Population

The study population refers to the specific group of people or cases that have been clearly defined, delimited, and are accessible to the researcher. This group represents the frame of reference from which the sample for the study will be selected. To be considered a population, it must meet a series of pre-established criteria, which ensure that the selected subjects are representative and appropriate for the research objectives.

In this case, the population consisted of elementary school students, specifically those in sixth and seventh grades at the Adventist Private School of Ecuador (UEPA CADE). This group was selected as the focus of the study due to its relevance and availability to participate in the research process, as well as meeting the necessary characteristics for data collection and analysis in the proposed educational context.

Sample

In any research, it is essential to define the exact number of participants needed to achieve the objectives set out at the outset. This number, known as the sample size, is determined or calculated using mathematical formulas or specific statistical tools. The calculation of sample size varies according to the characteristics of each study and is influenced by factors such as the study design, the hypotheses formulated, the number of groups to be analyzed, and the type of scale used to measure the variables. These elements ensure that the sample is representative and adequate for obtaining reliable and relevant results.

For this research, it was established that the sample would consist of the 55 boys and girls enrolled in sixth and seventh grades at the Adventist Private School of Ecuador (UEPA CADE), as this represents the total population accessible for the study. This sample was selected through non-probabilistic convenience sampling, which means that ease of access to participants was chosen in order to carry out the research. In addition, detailed eligibility criteria were used to ensure that participants met the necessary characteristics for the study, excluding those who did not meet the established requirements.

Inclusion Criteria

- EUPA CADE students enrolled in grades 6 and 7 of basic education.
- Children with informed consent signed by their legal representatives.
- Children with regular school attendance (>80 %).
- Children willing to participate in the surveys.

Exclusion Criteria

- Students outside the established grades.
- Children not enrolled during the current research period.
- Children whose representatives did not give informed consent.
- Children who did not want to participate voluntarily in the research.
- Children in the process of withdrawing or transferring from the institution.

Data collection instruments

For data collection in this document, a structured questionnaire was used based on the thesis entitled

Educational intervention on handwashing knowledge and practices among primary school students in a Peruvian public educational institution.[5] This had to be adapted to the local context to focus on the overall objective of this research, covering topics such as hygiene knowledge, daily hygiene practices, and access to health services, allowing for a comprehensive assessment of the factors that influence caregivers' hygiene practices. According to a study, the questionnaire is a fundamental tool in quantitative research, designed to collect data in a uniform manner through a set of structured questions. This technique allows valuable information to be obtained about the opinions, attitudes, and behaviors of respondents, facilitating statistical analysis and the generalization of results, positioning itself as a key instrument for validating hypotheses and exploring specific phenomena efficiently.

The instrument was based on the questionnaire from the aforementioned thesis, which addresses hygiene practices, and was adapted to three dimensions: 1) Demographic data (items 1 to 3); 2) Source of information on handwashing (items 4 and 5); 3) Knowledge about handwashing, divided into general knowledge about handwashing (items 6 to 20) and knowledge about the handwashing procedure (items 21 to 27). The latter uses a response scale in which 2 points are assigned to the correct answer and 1 point to the incorrect answer. Finally, an overall rating scale was used to measure the level of knowledge:

Validity and reliability of the instrument

To ensure the validity of the questionnaire, it was submitted to a validation process by experts in the field of health and education, who reviewed the items to ensure that they were aligned with the research objectives. A content analysis was performed to confirm that the questions were relevant and covered the necessary aspects for assessing knowledge about handwashing.

In terms of reliability, Cronbach's alpha coefficient was used to assess the internal consistency of the questionnaire. The results obtained indicated a value of α = 0,85, demonstrating that the instrument has high reliability and is suitable for measuring students' knowledge of handwashing. This value suggests that the questions within each dimension of the questionnaire are consistent with each other, which increases the accuracy of the results obtained.

Indicador	Escala	Puntajes	Nivel
Óptimo		38-44 puntos	Óptimo
regular	Ordinal	30-37 puntos	Regular
deficiente		22-29 puntos	Deficiente

Figure 1. Knowledge Level Scale

This questionnaire was administered twice: before and after the educational intervention, as a pre- and post-test. However, for the present research, the questionnaire had to be administered only once, given that the main objective is to measure students' knowledge level in a context prior to any educational intervention. This ensures that the data obtained reflect students' prior knowledge about handwashing, without being influenced by the effect of the intervention.

The validity of the questionnaire was confirmed by experts in child health and education, who reviewed the items in detail to ensure their relevance and clarity, thus aligning them with the objectives of this study. This process reinforced the validity of the content, ensuring that the instrument (questionnaire) is suitable for assessing hygiene practices in the specific context of the Adventist Educational Unit of Ecuador (CADE).

Data processing and analysis plan

The collected data were processed in a structured and thorough manner to ensure the quality and reliability of the results. The process began with a comprehensive review of the questionnaires to verify the integrity of the data. This review allowed for the identification and exclusion of questionnaires that were incomplete or not aligned with the main objective of the study, thus ensuring that only data relevant to the analysis were included.

Once the information had been verified, the entire data set was organized in an Excel spreadsheet. This step was essential for segmenting the data into predefined categories, which facilitated subsequent analysis. In addition, questions with dual-type answers (such as "Yes" or "No") were grouped and coded so that statistical analysis could be performed simply and efficiently.

The next step was to classify the responses into specific variables to analyze frequencies and percentages. Responses to more open-ended questions, or those that required more detailed interpretation, were coded and grouped into categories that allowed for the observation of common patterns and trends among students. In this way, the data was prepared for the descriptive statistics that would be used in the final interpretation of the results.

Finally, statistical software was used to process and obtain numerical results, which were presented in graphs and tables, facilitating visual interpretation and comparison between different groups of students.

On the other hand, descriptive statistical techniques, such as frequency and percentage, were applied to analyze the data, allowing the information to be summarized clearly and accurately to determine whether there were significant differences between the groups of children in terms of knowledge and practice of handwashing. To this end, Microsoft Excel software was used Microsoft Excel software was used, which facilitated the organization and visualization of the information collected.

Ethical considerations

In research, ethical considerations are essential to ensure that the rights, safety, and well-being of participants are respected. In conducting this research on handwashing, various ethical considerations were taken into account to ensure the respect and protection of participants.

Before starting the study, all participants were provided with an informed consent form detailing the purpose of the research, the procedures to be followed, and their right to withdraw at any time without consequences. This ensured that their participation was voluntary and fully understood. Anonymity was ensured by not collecting personally identifiable data or requesting names in the surveys, and responses were recorded anonymously. In addition, access to the information was limited exclusively to the research team, and the data is stored securely and used only for research purposes. All ethical principles were respected to ensure that participants felt comfortable and secure in sharing their information.

RESULTS

In the results section, researchers present the data or information collected using the method employed in the study in a structured manner, which contributes to the understanding and development of the phenomenon under investigation. For the purposes of this research, the instrument was applied in two phases (pre-test and post-test).

Pre-test results

Dimension Demographic Data

Figure 2 presents the demographic data of the sample in percentage form. It can be seen that 52 % are 6th grade students, while 48 % are 7th grade students. In terms of age range, 34 % of the participants were between 9 and 10 years old, and 66 % were between 11 and 12 years old. Regarding gender, 66 % were female and 34 % were male.

Indicador					Total	
Grado	6to		7mo			
	N°	%	N°	%	N°	%
	26	52	24	48	50	100
Rango de edad	9 a 10		11 a 12		N°	%
	N°	%	N°	%		
	17	34	33	66	50	100
Sexo	Femenino		Masculino		N°	%
	N°	%	N°	%		
	33	66	17	34	50	100

Figure 2. Demographic Data

Dimension Information

In figure 3, related to the receipt of information on handwashing, 100 % of the sample indicated that they had received information about handwashing.

Indicador	Sí		No		Total	
	N°	%	N°	%	N°	%
	50	100	0	0	50	100

Figure 3. Receipt of Information

Figure 4, referring to the source of information on handwashing, shows that 40 % of participants reported receiving information from their parents, while 60 % indicated that it was provided to them at school.

Indicador	N°	%
Mis padres	20	40
En la Escuela	30	60
Los dos anteriores	0	0
Otros	0	0
Total	**50**	**100**

Figure 4. Source of Information

Dimension Knowledge about handwashing

Figure 5, which focuses on general knowledge about handwashing, shows that 100 % of respondents recognized that this practice prevents disease. When asked whether they considered it an important health behavior, 98 % answered correctly and 2 % incorrectly. Regarding the relationship between not washing hands and disease Regarding diarrhea, 92 % answered correctly, while 8 % answered incorrectly. Regarding the ability of handwashing to prevent the spread of influenza, 94 % answered correctly and 6 % incorrectly, although only 46 % identified that influenza is transmitted through the hands, compared to 54 % who answered incorrectly. Regarding the appropriate time for hand washing, 82 % answered correctly, while 18 % answered incorrectly. Regarding washing hands only when they are dirty, 96 % answered correctly and 4 % incorrectly. Regarding washing hands before eating, 40 % answered correctly and 60 % incorrectly, while only 16 % indicated that it is necessary to wash hands before going to the bathroom, compared to 84 % who answered incorrectly. Regarding washing hands after cleaning the home, 98 % answered correctly and 2 % incorrectly. Regarding washing hands after playing with a clean animal, 92 % answered correctly and 8 % incorrectly. Regarding the exclusive use of antibacterial soap, 64 % answered correctly and 36 % incorrectly. Regarding the holes in the soap dish and their function in hand washing, 56 % answered correctly and 44 % incorrectly. Regarding the materials used for hand washing, 98 % answered correctly and 2 % incorrectly. Finally, only 4 % considered paper towels to be better for drying hands, while 96 % answered incorrectly. These results reflect areas of solid knowledge, but also aspects that require further educational reinforcement.

Indicador	Correcto		Incorrecto		Totales	
	N°	%	N°	%	N°	%
Práctica para prevenir enfermedades	50	100	0	0	50	100
Conducta importante para la salud	49	98	1	2	50	100
El no lavarse las manos puede causar diarrea	46	92	4	8	50	100
El lavado de manos puede evitar el contagio de gripe	47	94	3	6	50	100
La gripe se puede transmitir a través de las manos	23	46	27	54	50	100
El lavado de manos debe durar mínimo 20 segundos	41	82	9	18	50	100

Solo se deben lavar las manos cuando están sucias	48	96	2	4	50	100
Se debe lavar algunas veces antes de comer	20	40	30	60	50	100
Se deben lavar antes de ir al baño	8	16	42	84	50	100
Se deben lavar después de hacer la limpieza en el hogar	49	98	1	2	50	100
Si juegas con un animal limpio, no es necesario lavar las manos	46	92	4	8	50	100
Se deben lavar las manos solo con jabón antibacterial	32	64	18	36	50	100
Los orificios de las jaboneras cumplen una función en el lavado de manos	28	56	22	44	50	100
Los materiales para el lavado son agua, jabón y toalla	49	98	1	2	50	100
Es mejor secarse las manos con toallas de papel	2	4	48	96	50	100

Figure 5. General Knowledge

Figure 6 describes the sample's knowledge of the correct handwashing procedure, reflecting the order of each step according to the participants' level of knowledge. Regarding wetting hands and turning off the tap, 56 % responded correctly and 44 % incorrectly. Regarding removing objects from hands and wrists, 84 % indicated this correctly, while 16 % were incorrect. Regarding turning on the tap and rinsing, 50 % responded correctly and the other 50 % incorrectly. Regarding covering hands with soap and rubbing the entire area for the appropriate amount of time, 90 % answered correctly and 10 % incorrectly. Regarding turning off the tap using the material used to dry hands, 42 % answered correctly and 58 % incorrectly. Regarding removing excess water and drying hands, only 32 % answered correctly, while 68 % answered incorrectly. Finally, regarding removing the paper towel or hanging up the towel, 66 % answered correctly and 34 % incorrectly. These results show a general understanding of the procedure, but also highlight specific steps where knowledge needs to be reinforced.

Indicador	Correcto		Incorrecto		Totales	
	N°	%	N°	%	N°	%
Mojar las manos y cerrar el caño	28	56	22	44	50	100
Retirar los objetos de manos y muñeca	42	84	8	16	50	100
Abrir el caño y enjuagar	25	50	25	50	50	100
Cubrir con jabón y frotar todas áreas de las manos húmedas por 20 segundos como mínimo	45	90	5	10	50	100
Cerrar el caño con el material usado para secar las manos	21	42	29	58	50	100
Eliminar el exceso de agua de las manos y secarlas	16	32	34	68	50	100
Eliminar el papel secante o tender la toalla	33	66	17	34	50	100

Figure 6. Knowledge of the handwashing procedure

Level of knowledge about handwashing

Indicador	Puntaje	N°	%
Óptimo	38-44 puntos	21	42
regular	30-37 puntos	29	58
deficiente	22-29 puntos	0	0
Totales		**50**	**100**

Figure 7. Level of knowledge about handwashing

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Figure 7 shows the participants' level of knowledge about handwashing, showing that 42 % had optimal knowledge, while 58 % had fair knowledge.

Post-test results

Dimension General knowledge about handwashing

In figure 8, which focuses on general knowledge about handwashing, 100 % of participants identified handwashing as a fundamental practice for preventing disease; 100 % recognized that it is an important health behavior; and the same percentage recognized that not washing hands can cause diarrhea. 100 % agreed that handwashing helps prevent the spread of influenza. 100 % correctly indicated that influenza can be transmitted through the hands. Regarding the duration of the procedure, 98 % of participants correctly answered that handwashing should last a minimum of 20 seconds, while 2 % gave incorrect answers. When asked whether hands should be washed several times before eating, 98 % answered correctly that this is not necessary, while 2 % answered incorrectly. All participants (100 %) recognized the importance of washing their hands before going to the bathroom, which is correct; the same number indicated that it is important to wash your hands after cleaning the house. 98 % said that the statement that it is not necessary to wash your hands after playing with clean animals is false, which is correct, while 2 % said it is true, which is incorrect. 98 % of respondents answered that the statement that you should only wash your hands with antibacterial soap is false, which is correct, while 2 % answered that it is true, which is incorrect. 100 % responded correctly that the holes in soap dispensers serve a purpose in hand washing. 100 % stated that it is correct that the materials for hand washing are water, soap, and a towel. 100 % correctly stated that it is better to dry your hands with a paper towel.

Indicador	Correcto		Incorrecto		Totales	
	N°	%	N°	%	N°	%
Conocimiento sobre la importancia del lavado de manos						
Práctica para prevenir enfermedades	50	100	0	0	50	100
Conducta importante para la salud	50	100	0	0	50	100
El no lavarse las manos puede causar diarrea	50	100	0	0	50	100
Prevención de enfermedades mediante el lavado de manos						
El lavado de manos puede evitar el contagio de gripe	50	100	0	0	50	100
La gripe se puede transmitir a través de las manos	50	100	0	0	50	100
Técnica adecuada de lavado de manos						
El lavado de manos debe durar mínimo 20 segundos	49	98	1	2	50	100
Solo se deben lavar las manos cuando están sucias	47	94	3	6	50	100
Se debe lavar algunas veces antes de comer	49	98	1	2	50	100
Se deben lavar antes de ir al baño	50	100	0	0	50	100
Se deben lavar después de hacer la limpieza en el hogar	50	100	0	0	50	100
Uso adecuado de materiales para el lavado de manos						
Si juegas con un animal limpio, no es necesario lavar las manos	49	98	1	2	50	100
Se deben lavar las manos solo con jabón antibacterial	49	98	1	2	50	100
Los orificios de las jaboneras cumplen una función en el lavado de manos	50	100	0	0	50	100
Los materiales para el lavado son agua, jabón y toalla	50	100	0	0	50	100
Es mejor secarse las manos con toallas de papel	50	100	0	0	50	100

Figure 8. General Knowledge

Figure 9 describes the sample's knowledge of the correct handwashing procedure, reflecting the order of each step according to the participants' level of knowledge. Ninety-eight percent correctly indicate that wetting your hands and turning off the tap is step 2, while 2 % place it incorrectly. One hundred percent correctly indicated that removing objects from the hands and wrists is step 1. Ninety-eight percent correctly indicated that turning on the tap and rinsing is step 4, but 2 % placed it incorrectly. 100 % correctly state that covering with soap and rubbing all areas of wet hands for at least 20 seconds is step number 3. 98 % correctly indicate that turning off the tap with the material used to dry hands is step number 6, while 2 % place it incorrectly. 98 % correctly state that removing excess water from the hands and drying them is step number 5, and 2 % place it incorrectly. 100 % correctly indicate that step 7 is to dispose of the disposable paper or hang up the towel.

Indicador	Correcto		Incorrecto		Totales	
	N°	%	N°	%	N°	%
Mojar las manos y cerrar el caño	49	98	1	2	50	100
Retirar los objetos de manos y muñeca	50	100	0	0	50	100
Abrir el caño y enjuagar	49	98	1	2	50	100
Cubrir con jabón y frotar todas áreas de las manos húmedas por 20 segundos como mínimo	50	100	0	0	50	100
Cerrar el caño con el material usado para secar las manos	49	98	1	2	50	100
Eliminar el exceso de agua de las manos y secarlas	49	98	1	2	50	100
Eliminar el papel secante o tender la toalla	50	100	0	0	50	100

Figure 9. Knowledge about the handwashing procedure

DISCUSSION

The discussion section of a research paper focuses on linking the findings with existing theory, the current state of the art, and the research itself. Unlike the results section, which is mainly descriptive, the discussion is mostly argumentative, as it involves analyzing the data, taking a critical stance, and evaluating the contributions of the study in a justified manner. For the purposes of this research, it will be developed in two sections, Pre-test and Post-test, and then the main results will be compared.[5,6]

Pre-test

Regarding the objective of determining the sociodemographic data of sixth and seventh grade children at CADE, Santo Domingo, in 2024, the results obtained reveal a balanced distribution in terms of educational level, with 52 % in sixth grade and 48 % in seventh grade. In terms of age, 34 % of participants are between 9 and 10 years old, while 66 % are between 11 and 12 years old. It is important to note that, according to the Ecuadorian education system, the typical age for sixth and seventh grade is between 10 and 12 years old, which indicates that most students are within the expected age range, reflecting consistency with the typical ages for these educational levels in the country.[7,8]

In terms of gender, the sample has a higher proportion of females (66 %) compared to males (34 %), which differs from the national trend, where enrollment is usually more balanced between genders. This finding could reflect specific enrollment trends at the institution or in the Santo Domingo region. According to data from the Ecuadorian Ministry of Education, at the national level, the gender distribution in basic education is generally balanced. For example, studies such as that by a study indicate that, in general, there are no significant differences in gender distribution at the upper basic education and high school levels in Ecuador. However, there may be local or institutional variations that explain this discrepancy.[9,10]

With regard to specifying the source of information on handwashing among sixth- and seventh-grade children at CADE, Santo Domingo, in 2024, the results indicate that the 100 % of sixth and seventh grade students have received information about handwashing, with 40 % attributing this teaching to their parents and 60 % to school, highlighting the importance of school education in promoting hygiene practices. Previous studies have demonstrated the effectiveness of educational interventions on hand hygiene within the school environment. For example, research conducted at the School in Cienfuegos, Cuba, implemented an educational program on hand hygiene in fourth-grade children, observing a significant improvement in students' knowledge and practices after the intervention.

Similarly, UNICEF developed guidelines for teachers in Ecuador, emphasizing the incorporation of hygiene and handwashing into school programming, seeking to disseminate the proper technique and routine necessary

for effective handwashing, recognizing the crucial role of schools in promoting healthy habits.

The predominance of schools as a source of information in the CADE is consistent with these initiatives, underscoring the responsibility of educational institutions in shaping hygiene habits, reflecting a trend observed in other research, where educational interventions in schools play a key role in promoting hand hygiene among children. However, parental involvement remains essential, as parents represent 40 % of the source of information, highlighting the need for collaboration between family and school to reinforce these practices. Collaboration between teachers and parents is vital to consolidate these habits and prevent infectious diseases in children.

According to knowledge about the basics of handwashing among sixth and seventh graders at CADE, Santo Domingo, in 2024, the results reflect that although sixth and seventh graders recognize the importance of handwashing, there are deficiencies in specific areas. For example, only 40 % of students identified the need to wash their hands before eating, and only 16 % considered it necessary to do so before going to the bathroom. In addition, only 46 % correctly recognized that the flu can be transmitted through the hands. These findings are consistent with studies conducted in other regions, such as that by a study, in the canton of Cuenca, which evaluated and modified the knowledge, attitudes, and practices of handwashing in children, initially finding significant deficiencies in knowledge and proper hand hygiene practices. After the implementation of an educational program, a notable improvement was observed in these areas.[11]

Similarly, a study conducted by a study in a school in the Guano canton, Chimborazo, showed that, prior to an educational intervention, only 35 % of children had adequate knowledge about handwashing. After the implementation of an educational project, this percentage increased to 90 %, demonstrating the effectiveness of educational interventions in improving hygiene knowledge. These findings underscore the importance of developing and implementing specific educational programs that promote proper hand hygiene practices among schoolchildren, thereby contributing to the prevention of infectious diseases in the child population. Considering that in the present investigation significant gaps persist in students' knowledge about specific moments and appropriate methods for handwashing, it is essential to design targeted educational interventions that address these deficiencies, fostering a culture of hygiene that improves health in the school community.[12]

With regard to determining the knowledge of sixth and seventh graders at CADE, Santo Domingo, in 2024, the results reveal that although sixth and seventh graders have a general knowledge of the handwashing procedure, there are deficiencies in specific steps, as only 42 % know that they should turn off the tap using the material used to dry their hands, and only 32 % know how to remove excess water and dry their hands correctly. These findings are consistent with other studies, such as that of a study conducted in a school in the canton of Cuenca, where he evaluated and modified the knowledge, attitudes, and practices of handwashing in children, initially finding significant deficiencies in knowledge and proper hand hygiene practices. After the implementation of an educational program, a notable improvement in these aspects was observed.

These results underscore the importance of reinforcing hand hygiene education, focusing on the specific steps of the procedure that show the greatest deficiencies. The implementation of specific educational programs can significantly improve knowledge and practices related to handwashing, contributing to the prevention of infectious diseases in children. In addition, it is essential that both the school environment and the home actively participate in promoting these practices, ensuring that children receive consistent and adequate information about the importance and correct execution of handwashing.[13,14]

Regarding the measurement of the level of knowledge of sixth and seventh graders at CADE, Santo Domingo, in 2024, on handwashing, the results indicate that 42 % of the sample has optimal knowledge about handwashing, while 58 % has average knowledge, which is cause for concern, as hand hygiene is essential for preventing infectious diseases. In this regard, the Pan American Health Organization (PAHO) emphasizes that hand hygiene saves lives and is an essential measure of self-care and prevention. However, as of 2020, this practice was not sufficiently ingrained in the population.[1]

In addition, a joint report by the World Health Organization (WHO) and UNICEF reveals that, in 2019, 43 % of schools worldwide lacked access to basic handwashing with soap and water, making it difficult to promote proper hygiene practices among students.[6]

A study conducted by a study in Ica, Peru, evaluated the effectiveness of an educational program on handwashing knowledge and practice among sixth-grade elementary school children during the COVID-19 pandemic. Before the intervention, significant deficiencies in knowledge and proper hand hygiene practices were identified. After the implementation of the educational program, a notable improvement in these areas was observed, demonstrating the effectiveness of educational interventions in promoting proper hand hygiene practices among schoolchildren. This study highlights the importance of implementing specific educational programs that improve knowledge and practices related to hand hygiene, involving both educational institutions and families, to ensure a culture of hygiene that contributes to disease prevention in the school community.[15,16]

Handwashing among schoolchildren is essential for preventing infections, especially since children are more susceptible to disease due to their developing immune systems and habits such as touching surfaces and putting

their hands in their mouths. However, several studies indicate that many children do not wash their hands properly, putting their health and that of others at risk. One of the main problems is a lack of knowledge about proper washing technique. Although children wash their hands regularly, they do not always cover all the necessary areas, such as their fingers, nails, and the backs of their hands, or they do not do so for the appropriate amount of time (20-30 seconds). In addition, some schools lack adequate access to clean water and soap, making it difficult to practice proper hygiene.[17,18]

Another challenge is inconsistent habits. Although schoolchildren learn the importance of handwashing, the frequency and adherence to the practice tend to decrease outside the school environment. Educational campaigns may not be sufficient if they are not reinforced with active support from parents, teachers, and the community. To improve adherence to handwashing, it is essential to implement ongoing educational programs, teach proper washing techniques, and create habits through repetition. In addition, ensuring access to the necessary resources (clean water, soap, and towels) in schools is key to reducing hygiene deficiencies.

CONCLUSIONS

The study revealed deficiencies in schoolchildren's hygiene practices, especially in the correct completion of handwashing, such as not turning off the tap with the material used to dry their hands or not properly removing excess water. These omissions compromise the effectiveness of washing and increase the risk of recontamination and the spread of germs. The lack of education on these issues in the school environment reflects the need to reinforce the teaching of proper handwashing techniques in educational programs.

Likewise, it was identified that knowledge about handwashing among schoolchildren is based mainly on practical experience acquired from their environment. However, many children do not apply the recommended technique properly, doing it quickly and without covering all areas or respecting the necessary time. Factors such as the availability of resources at school and social norms also influence these habits. Therefore, it is essential to complement empirical learning with formal education that ensures the adoption of effective practices for the prevention of infectious diseases.

RECOMMENDATIONS

Implement educational programs that teach children the importance of handwashing, the appropriate times to do so (before eating, after using the bathroom, after returning from school, etc.), and the correct technique. The use of visual aids and practical activities is recommended to effectively reinforce these habits.

Ensure the availability of resources in schools, guaranteeing access to drinking water, soap, paper towels, or air dryers. The absence of these supplies hinders proper hygiene and reduces the effectiveness of disease prevention strategies.

Establish continuous supervision and reinforcement, conducting periodic monitoring to verify that students are applying proper handwashing techniques. In addition, it is suggested to integrate playful activities, such as games and competitions, to encourage the habit in an entertaining way.

Involve parents and the community in hygiene education by providing them with information and strategies to reinforce these habits at home. It is also recommended to include communities in awareness campaigns to strengthen awareness of the importance of handwashing.

Promote a favorable environment for handwashing by establishing specific times, such as before and after meals, so that children incorporate it as a daily routine into their school day.

Evaluate the effectiveness of educational interventions on hygiene in different age groups and socioeconomic contexts.

Analyze the relationship between access to hygiene infrastructure and the incidence of infectious diseases in the school population.

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