

Knowledge and attitudes of caregivers, promoting the importance of hand washing for the prevention of diarrhea in children under five years of age

Abstract

The purpose of the study was to establish a prevention program aimed at modifying the knowledge and attitudes of caregivers, promoting the importance of handwashing for the prevention of diarrhea in children under five years of age in the township of Belisario Porras, District of San Miguelito, and thus validate a prevention program aimed at modifying the knowledge and attitudes of caregivers promoting the importance of handwashing. It is a quantitative correlational descriptive research with a quasi-experimental research design, field type. As for the population, it consisted of 30 families in the "Asentamiento La Victoria", district of Belisario Porras, District of San Miguelito, and the sample corresponded to the number of 16 caregivers belonging to 10 families living in the mentioned place, therefore, the type of sample is non-probabilistic and intentional. The data collection technique was through a survey, with the instrumental support of a questionnaire. Based on this premise, it was concluded that diarrheal disease is one of the main causes of malnutrition in children under five years of age. In addition to mentioning that it is the second cause of death in this age group, where unfortunately, according to the World Health Organization (WHO), the causal factor is mainly due to the lack of hygiene in food handling; in this sense, part of the respondents are aware of the prevention measures in cases of diarrhea; However, this is unfounded, because in practice, hand washing hygiene is not carried out in a responsible and adequate manner, and this is the main cause of food contamination and of causing diarrhea in children under five years of age.

Keywords: caregiver, diarrheal episodes, prevention, handwashing, knowledge, attitudes

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Abbreviations: WHO, world health organization; MINSA, ministry of health of Panama

Introduction

Diarrhea is defined as an increase in the frequency, volume and fluidity of stools. It is common for a child to go through one to three episodes per year of acute diarrhea during their first years of life. This problem is exacerbated in low- resource areas and developing nations, according to 2017 WHO data.¹ This condition is identified by an imbalance in the intestinal functions responsible for the absorption and excretion of fluids and electrolytes, crucial for the physiological well-being of the human being. Thus, a modification in the consistency and number of daily bowel movements, altering the performance of the digestive system, is classified as acute diarrhea.²

Consultations for diarrheal diseases constitute one of the most common reasons for medical attention. It is essential to understand its epidemiology, causes, development, ways of identification and prevention methods to combat it effectively.³ Diarrhea is among the leading causes of infant morbidity and mortality. It is imperative to have effective treatments and develop preventive practices, as well as educational programs that focus on the management of these episodes. The severity of acute diarrhea varies according to its origin and the volume of liquid stool, which leads to inadequate water absorption, loss of appetite and reduction of essential nutrients, and may result in the infant's death.⁴ Acute diarrhea is presented as a public health challenge, with overcrowding, lack of sanitation and poor hygiene practices being some of the main risk factors in disadvantaged communities. Conducting educational campaigns and improving

sanitation infrastructures are essential to address this challenge.³ The incidence rate of diarrhea in children living in marginalized communities can reach three episodes per year. The implications of this condition are directly reflected in the retardation of child growth and development, thus contributing to the problem of chronic malnutrition observed in this population group.⁵ To mitigate the impact of diarrhea, it is crucial to improve access to basic sanitation services, including the availability of safe drinking water in urban and rural areas. However, these measures should be complemented by strategies that promote a change in personal and household hygiene practices.⁶ Hand washing hygiene has gained notoriety as a primary prevention strategy, highlighting its effectiveness especially when complemented with the use of soap. This practice stands as an essential shield against the transmission of diseases by fecal- oral contact, particularly against severe pathogens such as Rotavirus and Shigella, recognized for their virulence.⁷

The use of soap, both in personal cleanliness and laundry, has been identified as the most effective method in the prevention of contamination and subsequent diarrhea, as demonstrated by recent studies.⁸ Despite the existence of numerous preventive tactics, hand washing stands out for its significant impact in reducing the incidence of diarrhea, underscoring the importance of this simple hygiene practice^{8,9} point out a direct connection between the limited socioeconomic and educational level of mothers and the scarce knowledge about how to prevent acute diarrhea in children under five years of age, suggesting greater dissemination of information about proper hygiene. Ibañez et al.¹⁰ found that mothers' knowledge of how to prevent acute diarrhea is, on average, moderate, recommending strengthening the education they receive in health centers, extending

it nationally and not limiting it to specific areas, to effectively address the problem of acute diarrhea. Research cited by Abreu, et al.¹¹ attributed the cause of diarrhea mainly to parasitic infections, noting that a minority of the cases studied were associated with inadequate hygiene practices such as hand washing. Surprisingly, few mothers limited breastfeeding and most were familiar with the procedure for preparing and using oral rehydration solutions. The research revealed that 41.9% of diarrheal episodes in children are due to parasitic infections related to poor hygiene. Associated symptoms include dehydration, drowsiness, irritability and tearless crying. In addition, enteric adenoviruses were shown to be a major viral cause of diarrhea in the infant population, affecting more than half of the infants in the study. This underscores the importance of hand washing as a key preventive measure to control and prevent diarrhea in children.^{11,12}

Lopez et al.¹³ conducted a study with 3,432 infants, analyzing the incidence of acute watery diarrhea and the effect of different probiotics (*Lactobacillus* spp, *Bifidobacterium* spp, *Streptococcus* spp, or *S. boulardii*) administered alone or in combination at various doses of the sixteen clinical trials reviewed, seven focused specifically on *L. rhamnosus* or *S. boulardii*. The results revealed that the incidence of acute watery diarrhea was reduced to 9% in the group that received probiotics, compared to 18% in the control group, which is equivalent to a risk reduction (RR) of 0.52; with a 95% confidence interval of 0.38 to 0.72. This benefit was especially noticeable in those children whose families did not possess adequate knowledge about hand washing hygiene practices.¹³ In addition, Lopez and his team concluded that the use of probiotics is effective in preventing acute watery diarrhea in healthy children, observing that only 8% of children who received probiotics developed diarrhea, compared to 11% of children who did not. On the other hand, Pérez, et al.¹⁴ in an analysis of 46 children admitted to a public hospital, determined that 19% of the children under three years of age had suffered at least one previous episode of diarrhea, this being the cause of admission for 39% of them. In addition, 24% of all patients and half of those readmitted were malnourished, and half had received oral rehydration therapy prior to admission. This study also highlighted that the main reasons for hospitalization for diarrhea included dehydration, acidosis and the presence of secondary infections. The average hospital stay was four days, with rotavirus being identified in 18% of the cases, adenovirus in 8%, and positive stool culture results for *Shigella*, *Salmonella* and *Campylobacter* in several patients. Seven percent of the children required hospitalization for more than 14 days.

Palacios¹⁵ stressed the critical importance of hand washing from the first months of life, arguing that infants who do not receive exclusive maternal care have a significantly higher risk of developing acute diarrhea. He further highlighted that the protective effect of hand washing is independent of other risk factors such as inadequate maternal education, lack of social support, and being the child of an adolescent mother. Finally, prospective research compiled by Snyder and Merson and later by Bern and collaborators have marked a before and after in the understanding of acute diarrhea, pointing out the importance of advancing knowledge on the pathogenesis, treatment and control of this condition, especially among the most vulnerable child population. These studies have contributed significantly to the global reduction in the incidence of acute diarrhea, although its prevalence is still closely linked to poverty levels in different regions.¹² On average, a child may experience from two episodes of diarrhea per year in developed countries to ten in less fortunate regions. Eighty-eight percent of these cases are attributed to unsanitary conditions, scarcity of drinking water and poor personal hygiene, conditions closely linked to poverty.⁷ Currently, it is estimated that around one

billion people lack access to safe drinking water, 1.2 billion defecate in the open, and one hundred and twenty-nine million children are underweight for their age. This scenario reflects how the prevalence of diarrhea and related hospitalization rates are directly influenced by the economic status of nations.¹⁶ Diarrhea not only accelerates malnutrition, but is responsible for 57% of the associated deaths. A detailed analysis reveals that malnutrition (34%), followed by socioeconomic factors (32%), lack of breastfeeding (16%), being of male gender (11%) and rotavirus infection (7%) are the main contributors to infant mortality from this cause.¹⁷ Malnutrition is a critical risk factor, there being a bidirectional relationship between it and diarrhea: malnutrition predisposes to diarrhea and, vice versa, frequent episodes of diarrhea aggravate malnutrition, this combination being a common cause of mortality in children under five years of age.¹⁷ Treatment using oral rehydration solutions has been recognized by Lancet in 1978 as one of the most significant medical advances of the 20th century, demonstrating that a simple solution can be decisive in saving millions of lives. In recent decades, the incidence of diarrhea has declined markedly due to a combination of factors, including improvements in hygiene practices, advances in medical treatment, and socioeconomic and educational development of populations. These advances have contributed to a healthier environment and a reduction in the disease globally.¹⁸

Rotavirus stands out as one of the most significant pathogens in the etiology of childhood diarrhea, emphasizing the importance of educating the population about its prevention and proper management to mitigate its impact.² The economic burden of diarrhea treatment on households is considerable, absorbing approximately 20% of monthly income in low-income families, according to a 2015 WHO study.¹⁹ This expense places significant financial pressure on affected families, particularly in Panama, where the average income can be significantly depleted by the costs associated with the disease. The 2015 WHO report highlights that diarrhea, closely linked to the quality of access to safe drinking water, is the second leading cause of child deaths globally. An estimated 1.3 million children under the age of five die from diarrhea annually, with a considerable percentage of these deaths occurring in developing countries. The implementation of sanitation measures and the promotion of handwashing have the potential to significantly reduce diarrhea-associated morbidity. WHO estimates that the combination of these strategies could decrease the prevalence of the disease by 35-50%, highlighting the effectiveness of these interventions to combat diarrhea globally.¹⁹ Child mortality from diarrhea in European nations was estimated at 1.87 million cases (with a 95% confidence interval of 1.56 to 2.19), representing about 19% of all deaths in children under five years of age. According to 2015 WHO data,¹⁹ Asia and the Middle East together account for 78% (1.46 million) of the global total of child diarrhea deaths in developing countries, with 73% of these fatalities concentrated in just 15 nations.

In the United States, a 79% reduction in the incidence of diarrhea was observed between 1968 and 1985, remaining stable until 1991. Children under one year of age were the most affected, accounting for 78% of deaths from this cause among children under five years of age. The average age of the deceased decreased from 5 months in 1968 to 1.5 months in 1991, reflecting an overall trend. In Latin America, the risk of acute diarrhea is especially high among children under five years of age, with most cases being infectious in origin. The most common pathogens include Rotavirus, Adenovirus, and Parvovirus, as well as bacteria such as *Escherichia coli*, *Shigella*, and *Salmonella*, and parasites such as *Entamoeba histolytica* and *Giardia lamblia*, according to WHO in 2015. The Global Burden of Disease (GBD) study indicates that the mortality rate due to diarrhea in Latin

America and the Caribbean is 19.3 per 100,000 inhabitants. Every year, nearly one million children under five die in Latin America, most of them under one year of age; more than 250,000 of these deaths are attributed to acute diarrheal diseases.²⁰ Currently, gastrointestinal infections are among the three leading causes of death in children under one year of age in 22 American countries, representing 4.7% of the total population in 20 Latin American countries and acute diarrhea being the cause of more than 15,000 deaths before the fifth month of life.¹⁹

In Panama, 15% of children under five are affected by acute diarrhea, particularly in rural areas and in households where caregivers have a low level of education, according to the 2014 IMCI report. This context underscores the need for a preventive program aimed at improving the knowledge and attitudes of caregivers in the Asentamiento La Victoria del Corregimiento Belisario Porras, District of San Miguelito, focusing on the importance of hand washing to prevent diarrhea in children under five years of age. The prevalence of acute diarrhea in the District of San Miguelito highlights the lack of knowledge about personal hygiene among caregivers, with inadequate hygiene being one of the main causes of this condition, according to the Panamanian Ministry of Health.²¹ Given this situation, the question arises as to the need to implement a prevention program to improve hygiene education among caregivers in order to reduce the incidence of acute diarrhea in children under five years of age in this community.

The study will seek to strengthen the understanding of the importance of hand washing within the family nucleus as a preventive measure against acute diarrhea, thus contributing to a significant improvement in child health and offering economic savings for families by reducing the need for hospital care, which represents a significant expense for households with limited income, especially in Panama where the cost of uncomplicated medical care for a child under five years of age can amount to B/60 Balboas, according to MINSA²¹ this preventive approach not only promises a positive impact on children's health, but also offers an opportunity to improve hygiene practices at the community level, thereby reducing the risk and prevalence of acute diarrhea in Panama.

This analysis will facilitate the identification of the limitations that have hindered health personnel in Panama from effectively managing this condition. Nurses play a crucial role in the treatment of this disease, which is frequently fatal due to inadequate practices in the management of acute diarrhea, a risk that could be mitigated from the outset with adequate personal hygiene measures, highlighting the importance of hand washing. The report of the San Miguel Arcángel Hospital states that the main causes of illness among children are linked to diseases derived from the lack of hygiene and environmental sanitation, as well as malnutrition caused by flu, diarrhea and anemia. Therefore, this study is relevant, since nursing professionals will provide valuable knowledge to the caregivers of children under five years of age in the La Victoria settlement, in the Belisario Porras district of San Miguelito, with the aim of preventing acute diarrhea. Implementing new methodologies to control diarrhea in this child population will ensure that hygiene practices taught by caregivers are improved and consolidated, not only preventing this specific disease but also other communicable diseases in a similar manner. The study seeks to reduce the incidence of acute diarrhea through the contribution of nursing professionals, who will emphasize the importance of a thorough knowledge and practice of hand washing, given the recurrence of these episodes related to the lack of personal hygiene. This analysis proposes that diarrhea can not only precipitate but also exacerbate undernutrition, contributing negatively to physical

growth. This adversity arises from inappropriate feeding practices during diarrheal episodes.²² It has been observed that diarrhea tends to be prolonged and occurs with greater severity in infants suffering from malnutrition. Malnutrition during diarrheal episodes can be caused by:

- a. The mistaken belief of needing to "give the stomach a rest" and not feeding the child during diarrhea. Research has shown that atrophy of the intestinal villi and enzyme depletion occur within hours after the last feeding. The presence of food in the intestine is vital to mitigate these effects, preserve normal intestinal structure and function, renew the intestinal mucosa and synthesize the required digestive enzymes.
- b. A decrease in nutrient absorption, caused by accelerated intestinal transit and mucosal damage. The ingestion of easily digestible foods favors the reabsorption of liquids, replenishes lost nutrients, promotes the recovery of intestinal villi both anatomically and functionally and, therefore, contributes to the reduction of diarrhea.
- c. Apathy towards feeding, it is crucial to insist on focusing more on the child's well-being than on the diarrhea itself, understanding that fluid replacement not only strengthens the child but also improves appetite, appearance and general well-being. Therefore, diarrhea is usually less prolonged and less severe in adequately nourished children. Lack of appetite may be intensified by the use of antiemetics and antispasmodics.

In terms of disease prevention, hand washing emerges as the most effective strategy against the transmission of pathogenic microorganisms, which can be spread through hands during everyday activities, both personal and social.²³

A globally widespread belief is that hand washing is only necessary to remove visible dirt, ignoring the importance of soap. Soap is essential, as it removes grease and dirt that harbor a large number of microorganisms.²⁴ It is advisable to use soap and water to clean hands when they are clearly dirty or after contact with contaminating substances, following a precise methodology that includes the amount of product, the time spent washing and the extent of the surface washed:²⁵

- A. The amount of product used.
- B. The time spent in friction or washing.
- C. The surface of the hand that has been rubbed or washed.

The effectiveness of hand hygiene increases when the skin is intact, nails are natural and short, without polish, and hands and forearms are free of jewelry and exposed.²⁴ After washing, it is crucial to dry hands completely to prevent dermatological conditions. The skin of the hands should be cared for by keeping them moisturized.²⁴ In this context, a visual guide (Figure 1) is presented as a reference for proper hand washing. Hand cleaning emerges as an essential resource that individuals possess to counteract infections of different types, emphasizing not only the application of this technique but also the transcendence of protecting health at the individual and collective level.²⁶ According to Silvia²⁶ this practice transcends its preventive nature to become an act of morality that promotes the benefit of individuals and communities, operating under the responsibility and ethical principles of health professionals. The role of hand washing in the prevention of diseases such as diarrhea does not fall exclusively on medical professionals, but also on the caregivers of minors, who must possess the necessary knowledge to ensure the child's well-being.²¹



Figure 1 Hand washing technique.

Therefore, it falls on the caregiver the responsibility to evaluate, reason and accept the repercussions of their actions or negligence regarding the care of the child in their care, highlighting its importance in the education and practice of personal hygiene of the infant.²¹

Materials and methods

General objective

To validate a prevention program aimed at modifying the knowledge and attitudes of caregivers by promoting the importance of handwashing for the prevention of diarrhea in children under five years of age.

Specific objective

- Apply the home visit questionnaire to diagnose the socioeconomic, geographic and basic services situation of caregivers of children under five years of age.
- Analyze the characteristics of the social environment of the participating population.
- To identify the degree of knowledge that caregivers have regarding hand washing to reduce episodes of acute diarrhea in children under five years of age.
- To describe the hygiene practices applied by the caregiver for the control of acute diarrhea in children under five years of age.
- Hypothesis.

H1: The greater the caregiver's knowledge and practice in hand washing, the lower the incidence of acute diarrhea.

H0: The lower the caregiver's knowledge and practices in hand washing, the higher the presence of acute diarrhea.

Research Design and Type of Study.

The present study will be based on a quasi-experimental design, descriptive level field type and under a non-experimental design, supported by a pretest that seeks to measure the knowledge of the caregivers, which is nomenclature under the following formula: **O1XO2**

Population

The subjects will be 16 caregivers belonging to 10 families living

in the settlement of La Victoria, district of Belisario Porras, District of San Miguelito. The type of sample is non-probabilistic, purposive.

Variable

The independent variable, Prevention Program, consists of the development of a preventive intervention in a variety of areas, whether at the health, school or family level, among others, in order to reduce or delay any situation or event that compromises the physical, biological and psychological integrity of the individual. The dependent variable, in the first place knowledge about diarrhea, knowledge is the facts or information acquired by a person through experience or education, the theoretical or practical understanding of a matter concerning reality; secondly Handwashing Practice, practice is the action that is developed with the application of certain knowledge, this being the exercise that is performed according to certain rules and may be subject to the direction of a teacher or professor, so that practitioners improve their performance; thirdly Decrease in episodes of diarrhea in the year, consists of the decrease in the frequency, fluidity and volume of feces. Its causes include bacteria, viruses, parasites, medications, functional disorders and food sensitivities.²⁷

Technique and instrument

The technique was the survey with the instrumental support of the questionnaire which will be composed in two parts:

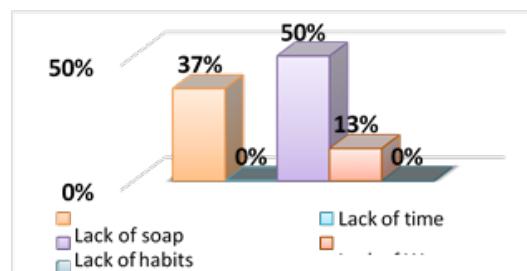
- Questionnaire to measure sociodemographic information, knowledge about diarrhea and handwashing, and socio-environmental factors, validated for the research and the socio-environmental part of the MINSA home visit report.
- Observation guide for the analysis of handwashing and hygiene habits.

Procedure

The research process was developed through several phases, which are described as follows: Phase I. Development of the scientific structure; Phase II. Elaboration, validation and reliability of the instruments; Phase III. Ethical procedure; Phase IV. Intervention stage; Phase V. Analysis of results.

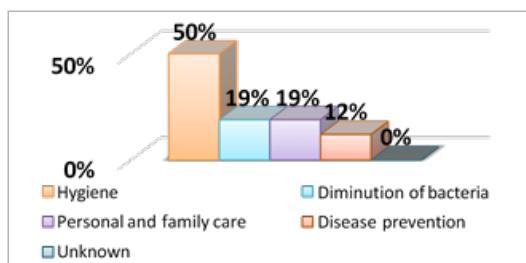
Results

The main cause of the lack of hand washing by those surveyed is due to the lack of habits, thus generating that, at the time of handling food, even utensils are contaminated due to the lack of hygiene, according to data in Graph 1. At first glance, it is evident that the surveyed participants recognize the advantage of hygiene based on hand washing; however, according to the answers given in the survey, this lacks effectiveness because the little time they dedicate to this task generates a weakness on the part of the individual in terms of the criteria they have for hygiene, as shown in Graph 2.



Graph 1 Difficulty in washing their hands with soap during critical moments.

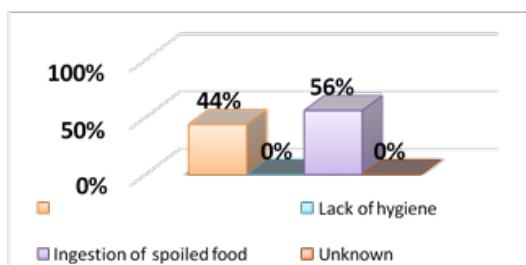
Source: Survey. Knowledge and practice of handwashing in caregivers of children under five years of age.



Graph 2 Advantages of washing your hands with soap during critical moments.

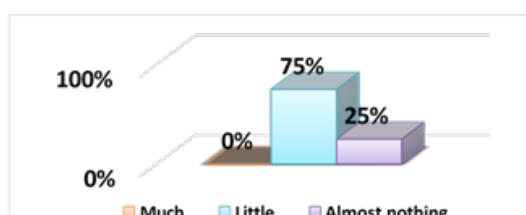
Source: Survey. Knowledge and practice of handwashing in caregivers of children under five years of age.

In turn, most of those surveyed recognize that the real causes of diarrhea are due to the ingestion of spoiled food, which corroborates the situation presented by the caregivers in terms of the lack of hygiene habits in hand washing, since doing so infrequently causes food to become contaminated, thus provoking diarrhea in children under five years of age.^{27,28} It should be noted that in the La Victoria settlement, the increase in illnesses has been notable in recent periods, as can be seen in Graph 3. However, the results show that some of the respondents are aware of the prevention measures in cases of diarrhea, but this is unfounded, because in practice hand washing hygiene is not carried out in a responsible and adequate manner, which is the main cause of contaminating food and causing diarrhea in children under five years of age, as shown in Graph 4. In agreement and continuity with the results, it can be seen that most of those surveyed do not maintain an adequate duration when washing their hands, which indicates that hand hygiene is lacking, thus generating that when handling any utensil or even when handling food, these are contaminated, causing possible diseases in those who consume it. This is evidenced in Graph 5. It can be seen that most of the respondents do not maintain an adequate duration when washing their hands, which indicates that hand hygiene is lacking, thus generating that when handling any utensil or even when handling food, these are contaminated, causing possible diseases in those who consume it.



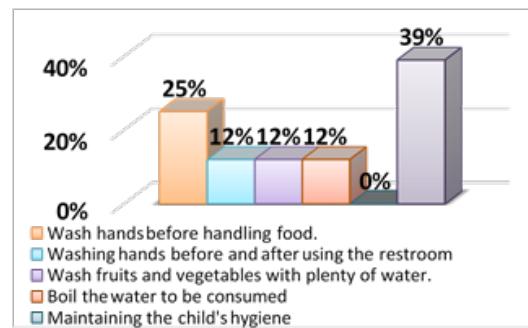
Graph 3 Cause of diarrhea.

Source: Survey. Knowledge and practice of hand washing in caregivers of children under five years of age.



Graph 4 Hygienic measures.

Source: Survey. Knowledge and practice of hand washing in caregivers of children under five years of age.



Graph 5 Hand washing duration

Source: Survey. Knowledge and practice of hand washing in caregivers of children under five years of age.

Discussion

Those attending the study recognize that one of the main causes of diarrhea is the consumption of spoiled food, which highlights the lack of proper hygienic habits in hand washing by caregivers, thus contributing to the contamination of food and, therefore, to the occurrence of diarrhea in children under five years of age. It has been observed that in the La Victoria settlement, illnesses have increased significantly in recent times. Although those involved are aware of the preventive practices against diarrhea, there is a gap between knowledge and application of these practices, showing a lack of commitment and precision in hand washing hygiene, which is a determining factor in the contamination of food and, consequently, in the incidence of diarrhea in children. A majority indicate that they wash their hands before handling and preparing food, which is crucial to protect the health of children who will consume these foods. However, an important segment of this group does not apply this practice on a regular basis, putting at risk not only the food but also the utensils used in its preparation. In addition, it is observed that most participants do not dedicate the necessary time to hand washing, which suggests poor hygiene that can lead to contamination of utensils and food during handling, increasing the risk of disease for those who ingest them.

Conclusion

Diarrhea in children under five years of age not only contributes significantly to malnutrition, but is also the second leading cause of mortality in this age group. According to WHO data, the main reason behind this reality is poor hygiene in the food handling process. There is a lack of adequate knowledge among caregivers about proper hand hygiene, as many of them only perform this practice once a day. This insufficient frequency of washing is counterproductive, especially when handling food, increasing the risk of contamination by the transmission of pathogenic microorganisms. In the settlement under study, the absence of direct access to the public drinking water network forces residents to rely on water tankers. This situation reveals how water scarcity constitutes an obstacle to maintaining adequate hand and personal hygiene, negatively affecting the daily health of the community. Although some respondents show an understanding of diarrhea preventive measures, there is a significant gap between theoretical knowledge and practical application. Hand washing, crucial to prevent food contamination and thus diarrhea, is not consistently and effectively carried out, underscoring the need to reinforce these essential hygiene practices among caregivers of children under five years of age.

Acknowledgments

None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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