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# Knowledge on viral gastroenteritis by health professionals at a referral maternity and child health hospital in Pará State, Brazil

Conhecimento sobre gastroenterite viral pelos profissionais de saúde de um hospital materno-infantil de referência no Estado do Pará, Brasil

Conocimiento sobre gastroenteritis viral por parte de los profesionales de salud de un hospital materno infantil de referencia en el Estado de Pará, Brasil

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## ABSTRACT

Viral acute gastroenteritis (AGE) is the major cause of morbidity and mortality in children under 5 years old, and rotavirus, norovirus, and astrovirus are indicated as the main causes. This study aims to verify the knowledge available to the doctors and nurses of neonatal and pediatric sectors of a referral maternity and child health hospital in Pará State, Brazil, about viruses related to AGE, their mode of transmission, and main prevention and control. It was conducted a descriptive exploratory research in 2011, using a questionnaire involving questions related to the profile of participants and about the proposed topic. After applying statistical test, a random selection of 60 participants was done. It was found that, during the presence of diarrhea, handwashing and hydration therapy are already well established by professionals, as well as isolation of patients affected by AGE. It was found that most of the participants had knowledge about rotavirus vaccine, number of doses, and age of application. Among the procedures to be performed in case of nosocomial outbreak, collection of samples for etiological definition and use of personal protection were the most mentioned procedures. Fecal-oral route and manipulation of fomites were the most mentioned main sources of transmission of these viruses. Whereas AGE is a major cause of medical consultations, hospitalization, and infant mortality, it is essential the awareness of health professionals about the easy transmission of these viruses to prevent their dissemination, contributing to morbidity reduction caused by these pathogens.
Keywords: Knowledge; Diarrhea, Infantile; Gastroenteritis.

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## INTRODUCTION

Gastroenteritis is a generic term for several pathological conditions in the gastrointestinal tract, the most common manifestation is diarrhea, which may be associated with nausea, vomiting, and abdominal pain. There is no universal concept of diarrhea and many definitions of the frequency, consistency, and water content of feces are reported in specialized literature[1,2].

Worldwide, the diarrheal syndrome is one of the main causes of childhood morbidity and mortality, with a variation in prevalence and etiology according to the localization[3].

According to Brazil's mortality indicators, in 2011, 3,449 deaths were related to diarrhea and gastroenteritis of presumed infectious origin. Concerning the State of Pará, Brazil, the number of deaths was 137 in the same year[4].

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As for hospitalizations for diarrhea and gastroenteritis in children under 5 years of age in 2013, in the State of Pará, the reported rate was 10,327 cases, with the highest numbers being registered in Belém, Ananindeua, and Altamira[5].

A wide variety of pathogens, such as bacteria, parasites, and viruses, have been associated with this disease[6]. Regarding the etiology of viral infections, rotaviruses stand out, due to their high prevalence rates[7]. However, other agents, such as noroviruses, sapoviruses, and human astroviruses, are becoming increasingly important as a cause of episodes of acute gastroenteritis (AGE)[8,9]. Considering that the transmission of these viruses occurs via the fecal-oral route, contamination of food, water, and objects[10] the introduction of prevention and control measures is necessary for both hospitals and at home.

Given the above, acute diarrheal disease remains one of the main public health problems and a major challenge for the authorities, despite the important advances achieved in the prevention and control of infectious diseases[11].

Therefore, this study aims to verify the knowledge available to doctors and nurses in the neonatal and pediatric sectors of a referral maternity and child hospital in the State of Pará about the viruses related to AGE, their way of transmission, and the main prevention and control measures.

## MATERIALS AND METHODS

The current study is descriptive-exploratory. It was developed in a referral maternity and child hospital, located in the city of Belém, Pará State. The sample consisted of nurses and doctors working in the neonatology and pediatrics sector. It was decided to include only these two professional categories because they are directly involved in determining actions and care plans aimed at pediatric patients with gastroenteritis.

A list containing the records of the professionals (doctors and nurses) was provided by the management of the neonatology and pediatrics sectors, which was used to define the sample universe to be studied, using BioEstat 5.0[12] software tools to perform a random sampling without replacement. Sixty participants were selected to be included in the study, 35 doctors (29 from neonatology and six from pediatrics) and 25 nurses (18 from neonatology and seven from pediatrics).

A structured questionnaire with closed-ended questions, consisting of 16 questions (4 on the participants' profile and 12 focusing on the topic that generated the study) was applied at the institution, between July and August 2011, according to the professionals' availability.

This study was authorized by the Research Ethics Committee of the Santa Casa de Misericórdia do Pará Foundation, under protocol n 050/11, on May 31, 2011.

## RESULTS

The professional profile considered the length of experience, analyzed in three ways: between sectors (neonatology and pediatrics), between professional categories (doctors and nurses), and between sectors and professionals. It was observed that: among nurses in the pediatric sector, the greatest length of employment was between three and six years (57.1% – 4/7); regarding the doctors, the range of less than one year prevailed (66.7% – 4/6). As for neonatology professionals, again, the length of employment, among nurses, was between three and six years (44.4% – 8/18), while doctors had more than ten years (44.8% – 13/29). Additionally, the analysis between the professional categories, regardless of the sector, showed that, among physicians, the work experience over ten years prevailed (37.1% – 13/35) and for nurses, the time was between three and six years (48% – 12/25).

Regarding the procedures to be taken in the management of childhood diarrhea, all pediatric professionals (100% – 13/13) selected hydration therapy as essential in these cases (Figure 1). This same procedure was the alternative indicated by the neonatology team in 95.7% (45/47) of the situations. The isolation of children with gastroenteritis was the second most cited by professionals in both sectors (pediatrics: 30.7% – 4/13 and neonatology: 46.8% – 22/47).

As for the knowledge that the professionals had about the existence of a vaccine against viral diarrhea, available in the public health network, it was found that 95% (57/60) of the participants answered that there is a vaccine and, of these, 96.5% (55/57) cited that it is specific for rotaviruses.

Information about vaccine doses to be administered and the recommended ages for application were also evaluated. 73.7% (42/57) of the professionals indicated, as correct quantities, two doses, and 90.5% (38/42) pointed out that they should be applied at 2 and 4 months of life. These results demonstrated that most participants have correct knowledge about the recommended measures (Figure 2).

About measures to prevent the spread of gastroenteritis, all nurses and doctors in pediatrics and neonatology selected handwashing as the main care. As a second prevention measure, the correct handling of food, which was reported by 85.8% (6/7) and 88.9% (16/18) of nurses, and 100% (6/6) and 89.7% (26/29) of doctors, from both sectors, respectively. However, it is worth noting the fact that one nurse (5.6% – 1/18) and two doctors (6.9% – 2/29) from the neonatology sector mentioned, as a preventive measure, avoid contact with blood from another person (Table 1).

Knowledge about the main enteropathogens related to cases of childhood diarrhea was also questioned, and on this, it was observed that viruses stand out among participants in pediatrics, with 84.6% (11/13) and neonatology, with 89.3% (42/47). The second pathogen selected by these two groups was bacteria, with a percentage of 30.7% (4/13) and 44.6% (21/47), respectively.

Another matter addressed in the research was about the participants' knowledge of the viral agents that cause gastroenteritis, such as rotavirus, norovirus, and astrovirus. Regarding this point, 58.3% (35/60) reported knowing these viral agents, with 88.5% (31/35) indicating rotavirus as the most well-known agent, followed by norovirus, with 5.8% (2/35). To the group that reported having limited knowledge (28.3% – 17/60), rotavirus remained the most cited agent (70.5% – 12/17), however, the percentage of norovirus and astrovirus increased by 27.5% (5/17) and 23.5% (4/17), respectively. Finally, among professionals who have heard about these viruses (5% – 3/60), rotavirus was again the most cited (66.7% – 2/3). Some participants claimed to be unaware of such viral agents and some did not answer the question (8.4% – 5/60).

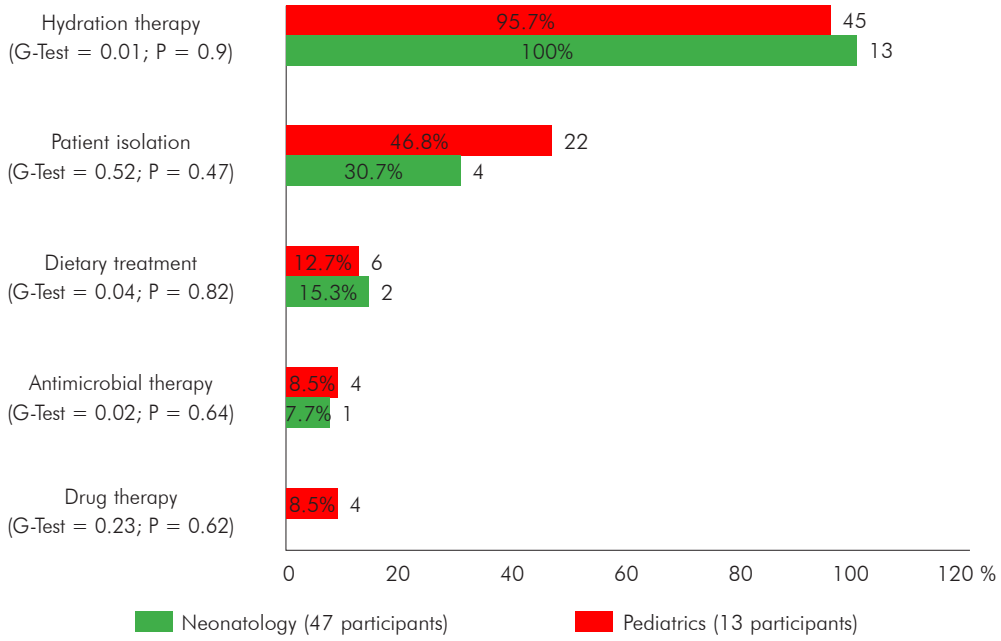
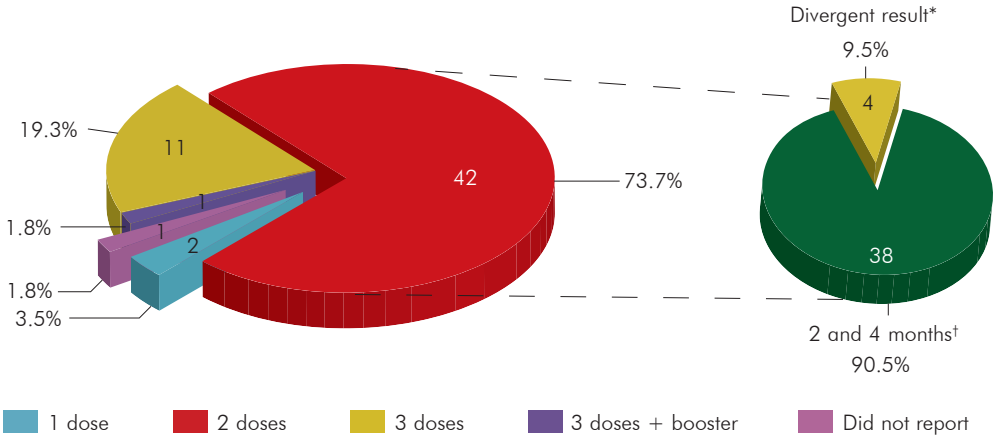



**Figure 1** – Priority care procedures to be performed in cases of childhood diarrhea, in the opinion of the neonatology and pediatrics teams of a maternal and child referral hospital in Belém, State of Pará, Brazil, in 2011




Note: * Two professionals did not know how to answer about the age range of application of the doses; one just informed that the vaccine should be administered at 2 months of age; and one said that it should be applied to children at 2, 4 and 6 months of life; † Age range cited by most participants.

**Figure 2** – Knowledge of the care team in the neonatology and pediatrics sectors of a maternal and child referral hospital about the dose number of rotavirus vaccine (VORH) to be administered. Belém, State of Pará, Brazil, in 2011

**Table 1** – Classification of the main procedures and preventive measures to be taken in case of gastroenteritis and nosocomial outbreak, according to the opinion of professionals working in the neonatology and pediatrics sectors of a maternal and child referral hospital in Belém, State of Pará, Brazil, in 2011

| | Pediatrics (13) | | | | Neonatology (47) | | | | General (60) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nurses (7) | | Doctors (6) | | Nurses (18) | | Doctors (29) | | Nurses (25) | | Doctors (35) | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| Preventive measures | | | | | | | | | | | | |
| Handwashing | 7 | 100 | 6 | 100 | 18 | 100 | 29 | 100 | 25 | 100 | 35 | 100 |
| Care in food handling | 6 | 85.8 | 6 | 100 | 16 | 88.9 | 26 | 89.7 | 22 | 88 | 32 | 91.4 |
| Avoid contact with vomit and feces | 6 | 85.8 | 6 | 100 | 15 | 83.3 | 23 | 79.3 | 21 | 84 | 29 | 82.8 |
| Use of lab coats, masks, gloves and caps | 5 | 71.4 | 4 | 66.7 | 14 | 77.8 | 26 | 89.7 | 19 | 76 | 30 | 85.8 |
| Constant disinfection of the environment | 6 | 85.8 | 3 | 50 | 13 | 72.2 | 21 | 72.4 | 19 | 76 | 24 | 68.6 |
| Avoid contact with another person's blood | – | – | – | – | 1 | 5.6 | 2 | 9.6 | 1 | 4 | 2 | 5.8 |
| Procedures | | | | | | | | | | | | |
| Sample collection from patients with diarrheal conditions | 6 | 85.8 | 5 | 83.3 | 14 | 77.8 | 27 | 93.1 | 20 | 80 | 32 | 91.4 |
| Isolation of infected patients | 5 | 71.4 | 3 | 50 | 16 | 88.9 | 24 | 82.8 | 21 | 84 | 27 | 77.2 |
| Antibiotics administration | – | – | – | – | 2 | 11.1 | – | – | 2 | 8 | – | – |

Regarding the procedures to be adopted in the event of the occurrence of a nosocomial outbreak, the most mentioned was sample collection from patients with diarrheal conditions to search for the etiologic agent (85.8% nurses and 83.3% doctors) and the use of personal protection (lab coats, masks, gloves and caps) when dealing with infected patients (71.4% nurses and 66.7% doctors, both registered in pediatrics). In the neonatology sector, the data obtained were similar, since, among nurses, both sample collection and use of personal protection had the same percentage, 77.8% (14/18), whereas, among doctors, the values found were 93.1% (27/29) and 89.7% (26/29), respectively. Another point to highlight is about to antibiotics administration in cases of diarrheal diseases in a nosocomial outbreak, whose percentage found in the research was 11.1% (2/18) among neonatology nurses (Table 1).

The opinion of the healthcare teams on the main sources of transmission of enteric viruses was also questioned, with the fecal-oral contamination being the most cited, both among pediatric (84.6% – 11/13) and neonatology (80.8% – 38/47) professionals. The infection due to food intake or manipulation of fomites was also reported by about 50% of respondents.

## DISCUSSION

Considering the great relevance of AGE as a cause of hospitalization, there was a need to assess the knowledge of the professionals who handle these patients, whether they are doctors or nurses, on how to proceed in the presence of these cases, in terms of treatment, prevention, and control.

Studies have shown that acute diarrhea is, in general, self-limited, with a tendency to spontaneously evolve to cure, and prevention, rehydration, and control of hydroelectrolytic disorders are essential for treatment[13]. Oral rehydration therapy (ORT), cited by most respondents, is usually indicated for children with mild to moderate dehydration and is performed by administering water with a little salt and sugar to restore the hydroelectrolytic balance[14]. Its wide use in several countries, including Brazil, has demonstrated its effectiveness and numerous advantages concerning to venous rehydration because it is a simple solution, of low cost, practically free of complications, and less traumatic for the child[15].

It is worth mentioning that, in addition to ORT, the current guideline is to maintain a normal diet and only resort to parenteral hydration when oral is not sufficient, especially in severe episodes[16,17].

According to the study participants, another approach to be taken in case of children hospitalization is to isolate, as far as possible, the patient affected by gastroenteritis, especially in severe cases, to avoid nosocomial infections[5]. Some authors claim that health workers who have gastroenteritis should be removed from their duties during infection and up to 72 h after the signs and symptoms resolution[18]. It is also necessary to emphasize that swapping employees dealing with patients with this clinical condition is not recommended, since there is a risk of spreading the disease.

It was found that most of the participants in this study demonstrated knowledge about the oral human rotavirus vaccine (VORH), the number of doses to be administered as recommended by the World Health Organization (WHO), as well as the recommended ages for its application. These data are of great relevance, considering the high rate of morbidity and mortality associated with rotavirus diarrhea.

Due to the severity of this virus, several studies have confirmed the need to obtain a vaccine, and, after years of study, two of them (Rotarix™-GlaxoSmithKlineBiological [GSK®] and RotaTeq™-RV5-Merck®) are available for use. Rotarix (VORH) has been introduced in the Brazilian national vaccination calendar since 2006, with the main objective of preventing the most serious forms of diarrheal disease[19]. Unlike other vaccines in the basic calendar, which can be administered late, VORH has a deadline set for its application, which requires an effort from all professionals to guide this particularity[20]. Therefore, to achieve favorable results, it is of great epidemiological importance to implement active surveillance in all geographic regions of Brazil to reinforce the information concerning the problem[21]. Therefore, to achieve favorable results, it is of great epidemiological importance to implement active surveillance in all geographic regions of Brazil to reinforce the information concerning the problem[21].

According to the results of this study, it is also possible to state that professionals are already aware of the importance of hand hygiene since all participants chose this alternative as the main preventive measure. This is a positive result, given that several scientific publications and manuals recommended by WHO state that this procedure is related to the reduction in infection rates[22,23,24]. Although it is an important fact, handwashing has a limited effect when considering the enteric viruses, because of frequent contamination by aerosol related to high concentrations of particles secreted in vomiting and diarrhea episodes. In a study presented at the Brazilian Congress of Pediatric and Neonatal Nursing on the hygiene of toys in childcare, the need for access to specific guidelines on the topic emerged, including the elaboration of cleaning and disinfection routines, since the contamination of toys by pathogens and the occurrence of infections carried by them, in hospitals and clinics, are directly related[25].

It was also found that viral agents were the most cited by professionals when it comes to enteropathogens related to cases of childhood diarrhea. This result agrees with a research carried out from 2007 to 2010, in a sentinel hospital, referring to the hospitalization of 481 children under 5 years of age, with severe AGE, in which 75.3% (362/481) had a viral etiology[21]. However, it is important to make a caveat regarding the publications about the role of these viruses in childhood diarrhea since research is generally conducted in hospitals, daycare centers, nursing homes, or in closed places, which generate a gap in the knowledge of the behavior of these agents in the community[26].

Analyzing the responses found regarding the viral agent most associated with AGE, rotavirus was the most cited pathogen, and this is due to numerous research already carried out to seek to understand its pathogenicity and ways of controlling infections. However, this etiological profile of diarrhea has been changing in recent years, due to the identification of other viral agents[3]. In an epidemiological bulletin published about the prevalence of severe acute diarrheal disease according to the etiologic agent (rotavirus, norovirus, and astrovirus), conducted between 2007 and 2010, it was noted that the prevalence of norovirus as an etiological agent of AGE was greater than that of rotavirus and astrovirus since the beginning of the research, in 2007[21].

A factor also worth noting in the analysis of the questionnaires is that three professionals in the neonatology sector cited, as a preventive measure for gastroenteritis, avoid contact with another person's blood. It is necessary to clarify that this information initially differs from the addressed subject and the numerous studies related to gastroenteritis. However, this form of transmission can be important for other viruses and pathologies.

In a retrospective study, carried out in 2005, with stool samples positive for rotavirus in a level 4 pediatric hospital, located in Braga, Portugal, it was found that hospitalization in the ward was particularly associated with the risk of nosocomial infection, which was detected in 28.6% of cases[27]. In the same study, the authors also comment that hygiene rules regarding the spread of the infection are extremely difficult to implement, especially when it is not possible to isolate these patients. In addition, infection control measures face difficulties in removing pathogens from contaminated hands and surfaces. 95% alcohol is an effective agent in removing rotavirus, however, most disinfectants commonly used for hand hygiene do not inactivate it[22].

Chemical disinfectants can be used to stop the spread of the virus on surfaces, especially those with the greatest potential for spread, such as door handles and handrails. Sodium hypochlorite has been widely recommended, due to the proof of its effectiveness[28].

Another important point to be highlighted refers to the administration of antibiotics in cases of diarrheal diseases, especially in the presence of a nosocomial outbreak. The Technical Report of the Brazilian Society of Immunization published that, even though

the use of antibiotics is a contraindicated therapeutic method for treating rotavirus infection, some studies still confirm its practice as an intervention in 25% of cases[29]. Therefore, no matter how small the percentage found in the research among neonatology nurses, it is necessary to emphasize that the use of antibiotics, even before knowing the etiology of the disease, is not recommended, since they have no efficacy in treatment of viruses, and, on the contrary, can stimulate the resistance of bacteria, in addition to other factors harmful to the child's organism[21]. A limitation found in this study was the fact that the questionnaire used did not include questions regarding the use of antibiotics in AGE, as well as the suspension of breastfeeding.

According to the result obtained regarding the transmissibility of these viruses, most of the research participants demonstrated knowledge about the subject, whether acquired through academic graduation or greater dissemination of the issue addressed. However, it is necessary to mention that rotavirus is recognized as the most important viral agent associated with gastroenteritis in the world. However, this etiological profile of diarrhea has been changing recently, due to the identification of other viral agents, such as norovirus, for example, considered the main cause of outbreaks of viral origin.

The Centers for Disease Control and Prevention (CDC), in Atlanta, USA, emphasizes that the transmission of enteric viruses occurs initially via the fecal-oral route, being propagated through person-to-person contact, through contaminated food and water, and aerosols[30]. This person-to-person transmission occurs directly through the handling of feces, through aerosols produced during episodes of vomiting, or even through indirect exposure, as well as through fomites[8].

It is also worth noting that outbreaks described more recently point to the importance of food, such as seafood, and water, as sources of secondary transmission for family members[31].

To further strengthen the knowledge of these professionals, an educational booklet was prepared, addressing basic aspects regarding viral agents, symptoms, transmission, diagnosis, treatment, vaccine, prevention, and control, which is done in a language accessible to both health professionals and the general public. Copies of this booklet were distributed in both sectors evaluated and have also been used as a health education tool in the dissemination of this topic.

## CONCLUSION

Gastroenteritis is still, nowadays, one of the main causes of consultation, hospitalization, and infant mortality. Therefore, the awareness of health professionals about the easy circulation of these viruses, during the handling of patients, is of fundamental importance in the control of new cases and, consequently, in the adoption of preventive measures aimed at reducing the transmission of viruses.

It is also necessary to emphasize that continuing education is a valuable tool in terms of acquiring knowledge and updating information and technologies, especially in the health area since this posture requires a skill change in the service, thus benefiting, an improvement in the service and enhancement of the assistance offered.

## Conhecimento sobre gastroenterite viral pelos profissionais de saúde de um hospital materno-infantil de referência no Estado do Pará, Brasil


### RESUMO

As gastroenterites agudas (GA) de origem viral são consideradas como uma das principais causas de morbimortalidade em crianças menores de 5 anos de idade, e os rotavírus, norovírus e astrovírus apontados como os principais responsáveis. Este trabalho visou verificar o conhecimento de que dispõem os médicos e enfermeiros dos setores de neonatologia e pediatria de um hospital materno-infantil de referência no Estado do Pará, Brasil, acerca dos vírus relacionados ao quadro de GA, da sua forma de transmissão, e das principais medidas de prevenção e controle. Realizou-se uma pesquisa descritiva-exploratória em 2011, por meio de questionário envolvendo perguntas relacionadas ao perfil dos participantes e referentes ao tema proposto. Após aplicação de teste estatístico, foi feita a seleção randômica de 60 participantes. Verificou-se que, durante quadro de diarreia, a lavagem das mãos e a conduta terapêutica de hidratação já estão bem instituídas pelos profissionais, assim como isolamento dos pacientes acometidos por GA. Constatou-se que a maioria dos participantes detém conhecimento sobre a vacina para rotavírus, a quantidade de doses e idades de aplicação. Dentre os procedimentos a serem realizados em caso de surto nosocomial, a coleta das amostras visando a definição etiológica e o uso de proteção pessoal foram as mais citadas. Quanto às principais fontes de transmissão desses vírus, a contaminação fecal-oral foi a mais mencionada, seguida por manipulação de fômites. Considerando que a GA é uma das principais causas de consulta, internação e letalidade infantis, é imprescindível a conscientização dos profissionais da saúde sobre a fácil transmissão desses vírus, para evitar sua disseminação, contribuindo para a diminuição da morbidade ocasionada por esses patógenos.


**Palavras-chave:** Conhecimento; Diarreia Infantil; Gastroenterite.

## Conocimiento sobre gastroenteritis viral por parte de los profesionales de salud de un hospital materno infantil de referencia en el Estado de Pará, Brasil

**RESUMEN**

Las gastroenteritis agudas (GA) de origen viral se consideran una de las principales causas de morbilidad y mortalidad en niños menores de 5 años de edad, y los rotavirus, norovirus y astrovirus son señalados como los principales responsables. Este trabajo tuvo como objetivo comprobar el conocimiento de que disponen los médicos y enfermeros de los sectores de neonatología y pediatría de un hospital materno infantil de referencia en el Estado de Pará, Brasil, acerca de los virus relacionados al cuadro de GA, de su forma de transmisión, y de las principales medidas de prevención y control. Se realizó una investigación descriptiva exploratoria en el año 2011, por intermedio de un cuestionario abarcando preguntas relacionadas al perfil de los participantes y referentes al tema propuesto. Luego de la aplicación de test estadístico, se hizo una selección aleatoria de 60 participantes. Se comprobó que, durante cuadro de diarrea, el lavado de las manos y la conducta terapéutica de hidratación ya están bien instituidas por los profesionales, bien como el aislado de los pacientes acometidos por GA. Se constató que la mayoría de los participantes tiene conocimiento sobre la vacuna para rotavirus, la cantidad de dosis y edades de aplicación. Entre los procedimientos a ser realizados en caso de brote nosocomial, la recolección de muestras para definir la etiología y el uso de protección personal fueron los más mencionados. Con relación a las principales fuentes de transmisión de esos virus, la contaminación fecal oral fue la más citada, seguida por la manipulación de fómites. Considerando que la GA es una de las principales causas de consulta, internación y letalidad infantil, es imprescindible la concienciación de los profesionales de salud sobre la fácil transmisión de esos virus, para evitar su diseminación, contribuyendo a la disminución de la morbilidad ocasionada por esos patógenos.

**Palabras clave:** Conocimiento; Diarrea Infantil; Gastroenteritis.

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