

**Bacteriologic analysis of liquid soap for hospital use****Análise bacteriológica do sabão líquido de uso hospitalar****Análisis bacteriológico del jabón líquido para uso hospitalario**

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This study aimed to perform a bacteriological analysis of the liquid soap used during the process of hand hygiene of health professionals in the hospitalization units in a Teaching Hospital in the countryside of Minas Gerais, MG, Brazil. It is a quantitative, exploratory and cross-sectional research. Data were collected from July to August 2014, to a total of 75 samples from different units of the hospital. After preparation, the samples were sent to microbiological analysis, and the growth of microorganisms or its absence was verified, as well as the contamination of the analyzed product. The data obtained allowed to conclude that the products standardized in this institution have the desired effectiveness and encourage other studies to be made.

**Descriptors:** Hand disinfection; Soaps; Contamination; Cross Infection.

Este estudo teve como objetivo realizar a análise bacteriológica do sabão líquido utilizado durante o processo de higienização das mãos dos profissionais de saúde nas unidades de internação em um Hospital de Ensino do interior de Minas Gerais. Trata-se de uma pesquisa quantitativa, exploratória e transversal. Os dados foram coletados nos meses de julho e agosto de 2014, perfazendo um total de 75 amostras em diferentes unidades do hospital. Após preparo as amostras foram encaminhadas para análise microbiológica investigando o crescimento ou não de microorganismos, assim como a contaminação do produto analisado. Os dados obtidos permitiram concluir que os produtos padronizados nesta instituição possuem a eficácia desejada, além de instigar a realização de demais estudos.

**Descritores:** Desinfecção das mãos; Sabões; Contaminação; Infecção hospitalar.

Este estudio tuvo como objetivo realizar el análisis bacteriológico del jabón líquido utilizado durante el proceso de higienización de las manos de los profesionales de salud en las unidades de internación en un Hospital de Enseñanza del interior de Minas Gerais (MG), Brasil. Se trata de una investigación cuantitativa, exploratoria y transversal. Los datos fueron recolectados en los meses de julio y agosto de 2014, totalizando un total de 75 muestras en diferentes unidades del hospital. Después de la preparación las muestras fueron encaminhadas para análisis microbiológico investigando el crecimiento o no de microorganismos, así como la contaminación del producto analizado. Los datos obtenidos permitieron concluir que los productos estandarizados en esta institución poseen la eficacia deseada, además de instigar la realización de otros estudios.

**Descritores:** Desinfección de las manos; Jabones; Contaminación; Infección hospitalaria.

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## INTRODUCTION

The World Alliance for Patient Safety, created in 2004, defined six international goals, among which is diminishing Health care-associated Infections (HCAI). The National Agency of Health Surveillance (ANVISA), partnered with the World Health Association (WHO) published the First Global Patient Safety Challenge, called: "Clean Care is Safer Care". The focus of this challenge is to prevent and diminish the incidence and severity of HCAs<sup>1</sup>.

Such measures complement what was determined in Decree 2616 from the Ministry of Health, from May 12, 1998, which establishes the minimum actions that need to be systematically developed to reduce the incidence and severity of HCAs. Therefore, the practice of hand hygiene in health services is an important tool in the working process<sup>2</sup>.

The hands of the health professionals are vehicles for the dissemination of microorganisms, since they can become permanently colonized by pathogenic microbiota acquired in the hospital environment, which contributes to the incidence of HCAs. An observational study in an Intensive Care Unit found that 43.7% practiced hand hygiene, an unsatisfactory number<sup>3</sup>.

Frequency is not enough to ensure that one adheres to hand hygiene processes, as it needs to be associated to the use of the right technique and adequate substances<sup>4</sup>.

Worldwide, the protocol that prescribes the correct practices of hand hygiene during health care establishes the five moments for the hand hygiene processes so that HCAs can be avoided: 1) before touching the patient; 2) before performing clean/aseptic procedures; 3) after the risk of exposure to body-fluids; 4) after touching the patient; 5) after touching surfaces near the patient. Other moments indicated for hand hygiene are when the hands are visibly dirty, stained by blood or other body fluids, after using the bathroom, after exposure to pathogens, after gloves are removed and before the handling of medication or the preparation of food<sup>3,5,6</sup>.

A relevant factor and potential cause for the diminishment of hand hygiene is that

some health professionals do not accept the products used, which, among other mentioned issues, are solutions that cause skin irritation<sup>4</sup>. The determination of an ideal chemical product for the hand hygiene process has been one of the concerns of health professionals, due to the diversity of products, the increasingly numerous options in the market, and the varied orientations when it comes to the correct way of using the products<sup>7,8</sup>.

In Brazil, the most common anti-germ agents in hospital practice are liquid soaps, 70% ethyl alcohol and antiseptic cleaning agents with 10% PVP-I and 4% chlorhexidine. These agents aim to eliminate or inhibit the growth of microorganisms when applied on the skin or on mucosae. However, for that to happen, the product must be stored and handled with care, so it remains adequate for future uses and has its efficacy guaranteed<sup>9</sup>.

Adherence to hand hygiene practices, despite being a simple measure, is efficient to diminish HCAs when done correctly and with the correct products. Nevertheless, if these products are misused, they can also become sources of multidrug-resistant bacteria contamination. In light of the above, the objective of this study was to conduct a bacteriologic analysis of the liquid soap used during the process of hand hygiene of the health professionals in the hospitalization units of a Teaching Hospital in the countryside of the Minas Gerais state.

## METHOD

This is an exploratory and cross-sectional study, and the field of the study was a tertiary teaching hospital, a reference for health care in the Triângulo Sul macro-region, with 302 active beds.

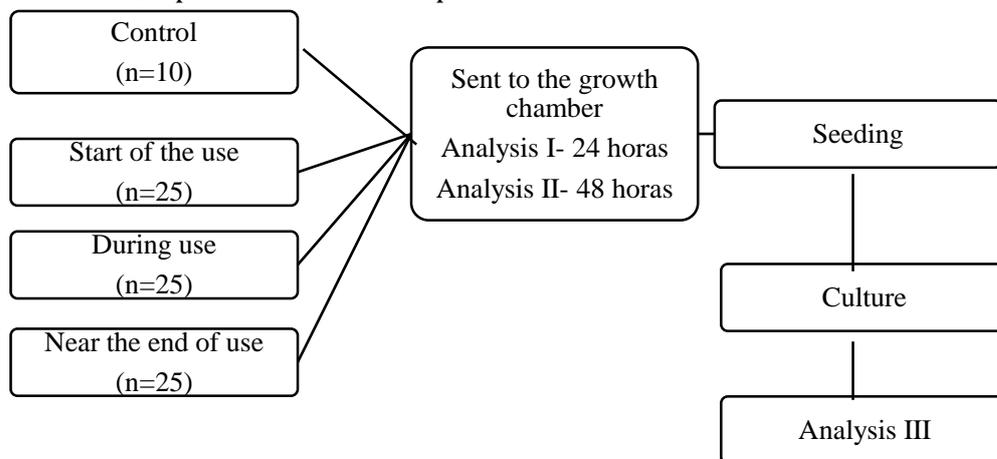
Sample collection took place in the following hospitalization units: Medical Clinic, Surgical Clinic, Nursery, Neonate Intensive Care Unit (ICU), Adult ICU, Coronary ICU, Neurology, Onco-hematology and Orthopedics. 75 samples of soap were collected from the gallons and dispensers of the units of the hospital in three different moments: when the product started being used, during its use, after an interval of at least

two weeks, and as the product was reaching its end. Collection happened during approximately 60 days and was conducted by previously trained researchers.

It should be highlighted that, in the institution of the research, two types of product are standardized: gallons and sachets. The sample covered both, always collecting whichever was being used at the moment of collection. The samples were aseptically deposited in test tubes containing 10 mL of Thioglycolate broth.

Sodium Thioglycolate is a reducing agent that maintains a low level of oxygen tension, favoring the growth of anaerobic and microaerophile microorganisms. Its use is recommended to test the sterility of biological and pharmaceutical products. When the medium becomes blurred, that indicates that microorganisms have grown, whereas a clean medium indicates that there was no growth<sup>10,11</sup>.

The procedures were organized in Microsoft Excel® Spreadsheets and separated



**Image 1.** Flow of collection and analysis of liquid soap samples - Uberaba, 2014.

Samples were immediately incubated in a growth chamber at 35°C for 24 hours. The absence of any blurring of the Thioglycolate broth indicated that there was no bacterial growth. After it was verified that there was no growth, the tubes were once again incubated in a growth chamber at 35°C. The procedure was repeated for 48 hours longer, after what all tubes were seeded using 10µL platinum loops, in plates containing blood agar and MacConkey agar, to confirm their sterility.

Data was recorded and tagged with (+) when there was bacterial growth in the

in two groups: samples with bacterial growth and samples with no bacterial growth. Data was analyzed through descriptive analysis. This study was approved by a Research Ethics Committee under Protocol 2621/2013.

**RESULTS**

The amount of anti-germ soap collected was that of 10 mL per sector (Image 1). During the collection procedure, the researchers were equipped and used aseptic techniques which minimized the chances of contamination.

Samples were tagged with data regarding their collection, such as sector, date, time of day and moment of use (start of use, during use, or as the product was nearing its end). Later, they were sent to the bacteriology lab, where they were seeded, cultured, and later analyzed for microbial growth. For the collection of the control group, the researchers made sure that the collected products would be of different batches.

analyzed tube or (-), when there was not. During the study, 75 samples were collected in units of the hospital, including: Medical Clinic, Surgical Clinic, Nursery, Neonate Intensive Care Unit (ICU), Adult ICU, Coronary ICU, Neurology, Onco-hematology and Orthopedics.

In all samples, according to the stratification, there was no microorganism growth after the culture. Therefore, the liquid soaps were not contaminated in any moment analyzed, which, once again, were before the

opening of the gallon for distribution, during the use of the soap, and at the end of its use.

## DISCUSSION

In the researched institution, 2% chlorhexidine soap is used. It is stored in two different ways: gallons or sachets, both having the same concentration. This difference contemplates the ways in which the product is dispensed.

In the control group, there was no microbiologic growth, which guarantees the efficiency of the product, however it is presented. The fact that there was no microbiological growth in this group also validates the technique used, which meant it could be used to analyze the following samples.

In the institution where the research was conducted, studies such as this one had not been conducted, although the water distributed in the hospital is routinely analyzed. The sample collection method was similar, which made it possible to routinely apply it in the institution.

The samples did not indicate any contamination of the liquid soap in the different moments of collection, even after it was manipulated, that is, used. The resistance of this type of product regarding bacteria growth results, among other factors, from the addition of chlorhexidine.

The antimicrobial activity of chlorhexidine is slower than that of alcoholic antiseptics, being, as a result, considered intermediary. Its residual effect, however, due to its strong bond to tissues, make it the better antiseptic available. A similar study with 59 samples of liquid soap flasks, found that 33 presented microbial growth. The contamination in the original flask of the same batch of liquid soap used to fill the dispensers was also verified. This research indicated that the liquid soap used in hospitals is a possible source of hospital infections, though it is not often seen as such, which indicates the risks that not observing good practices of production can bring to the users of cleaning/hygiene products<sup>12</sup>.

Concerning hand hygiene, for it to be effective, in addition to the use of adequate

products (such as liquid soap and other antiseptic agents), the professional is also responsible for using an adequate mechanical friction technique.

The frequency is another important aspect. The health professional must respect the five moments that ANVISA prescribes for an effective hand hygiene<sup>8,9</sup>.

Therefore, the importance of investigating the antiseptics used in the hospital environment<sup>7</sup> stands out, as well as the need for other studies that aim to analyze this product (antiseptics), since there are few studies on the subject.

## CONCLUSION

Data found in this study allows one to conclude that the chlorhexidine antiseptic anti-germ products used in this institution have the required efficiency.

The results reiterate the importance of routinely checking the products being used in health institutions, especially those that are used in the prevention of hospital infections, such as soaps and antiseptic, and suggest investigating other aspects of hand hygiene, such as the use of a correct technique and the frequency in which it is conducted, since hospital infections are still significantly prevalent in health institutions.

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#### CONTRIBUTIONS

**Damiana Aparecida Trindade Monteiro and Glendha Oliveira Arduini** took part in the design, analysis, data interpretation and writing of the article. **Divanice Contim** participated in the conception, design, analysis and interpretation of data, as well as in its critical review. **Marcelo Costa Araújo** contributed in the analysis and interpretation of data. **Luciana Paiva and Gilberto de Araújo Pereira** took part in the analysis and interpretation of data, as well as in a critical review.

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