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REVIEW ARTICLE

Alcohol preparation consumption for hand hygiene in outpatient clinics and Day Hospitals: an integrative review

Consumo de preparação alcoólica para higienização das mãos em ambulatórios e Hospitais-Dia: revisão integrativa

Consumo de preparados alcohólicos para higiene de manos en Hospitales-Día y ambulatorios: revisión integradora

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ABSTRACT

Background and Objective: the alcoholic preparation consumption indicator is a measure that can help monitor compliance with hand hygiene, however there is no guidance regarding the profile for application of consumption reference published by the World Health Organization for many health institutions. Thus, the study sought information available in scientific literature to support the definition of alcohol preparation consumption for hand hygiene in outpatient clinics and Day Hospitals. **Method:** an integrative review for the period between 2010 and 2021, conducted in the Scopus, Web of Science, SciELO, PubMed/MEDLINE, Cumulative Index to Nursing and Allied Health Literature, Database on Nursing and Latin American and Caribbean Literature on Health Sciences databases, through the Virtual Health Library. Five articles were selected, being divided into two categories: Milliliters of alcoholic preparation for each hand hygiene, identifying the expected average volume of 3 ml, and Consumption of alcohol-based hand rub per patient-day, observing the prevalence of studies in general hospitals. A study brought the perspective regarding consumption in a Nursing Home. **Conclusion:** in the review, no articles related to outpatient clinics and Day Hospitals were found. The selected studies demonstrate that alcohol preparation consumption for hand hygiene is different depending on the profile of the sector and the patient treated and that both the minimum volume for each hand hygiene and the opportunities are not considered for analysis of the indicator.

Keywords: *Hand Hygiene. Local Anti-Infections. Ambulatory Care. Day Care, Medical. Health Status Indicators.*

RESUMO

Justificativa e Objetivo: o indicador de consumo de preparação alcoólica é uma medida que pode auxiliar

no monitoramento da adesão à higienização das mãos, entretanto não existe direcionamento quanto ao perfil para aplicação da referência de consumo publicada pela Organização Mundial da Saúde para muitas instituições de saúde. Assim, o estudo buscou analisar as informações disponíveis na literatura científica para subsidiar a definição do consumo de preparação alcoólica para higienização das mãos em instituições ambulatoriais e Hospitais-Dia. **Método**: revisão integrativa referente ao período entre 2010 e 2021, realizada nas bases de dados Scopus, *Web of Science*, SciELO, PubMed/MEDLINE, *Cumulative Index to Nursing and Allied Health Literature*, Banco de Dados em Enfermagem e Literatura Latino-Americana e do Caribe em Ciências da Saúde, através da Biblioteca Virtual em Saúde. Foram selecionados cinco artigos que abordam o tema, sendo divididos em duas categorias: *Mililitros de preparação alcoólica para cada higienização das mãos*, identificando-se o volume médio previsto de 3 ml, e *Consumo de preparação alcoólica por paciente/dia*, observando-se a prevalência de estudos em hospitais gerais. Um estudo trouxe a perspectiva referente ao consumo em uma Instituição de Longa Permanência. **Conclusão**: na revisão, não foram encontrados artigos relacionados a ambulatórios e Hospitais-Dia. Os estudos selecionados demonstram que o consumo de preparação alcóolica é diferente dependendo do perfil do setor e do paciente atendido e que tanto o volume mínimo para cada higienização das mãos quanto as oportunidades geralmente não são considerados para análise do indicador.

Descritores*: Higiene das Mãos. Anti-Infecciosos Locais. Assistência Ambulatorial. Hospital-Dia. Indicadores Básicos de Saúde.*

RESUMEN

Justificación y Objetivos: el indicador de consumo de preparados alcohólicos es una medida que ayuda a monitorear la adherencia a la higiene de manos, pero no existe una orientación respecto al perfil de aplicación de la referencia publicada por la Organización Mundial de la Salud para muchas instituciones de salud. Así, el estudio buscó información disponible en la literatura científica para sustentar la definición del consumo de preparados alcohólicos en instituciones ambulatorias y Hospitales Día. **Método:** una revisión integrativa para el período comprendido entre 2010 y 2021, realizada en bases de datos Scopus, *Web of Science*, SciELO, PubMed/MEDLINE; *Cumulative Index to Nursing and Allied Health Literature*, Base de Datos de Enfermería y Literatura Latinoamericana y del Caribe en Ciencias de la Salud, a través de la Biblioteca Virtual en Salud. Se seleccionaron cinco artículos que abordaban el tema y se dividieron en dos categorías: Mililitros de preparación alcohólica para cada higiene de manos, identificando el volumen promedio esperado de 3 ml, y Consumo de preparación alcohólica por paciente-día, observando la prevalencia de estudios en hospitales generales. Un estudio trajo la perspectiva sobre el consumo en una Institución de Larga Estancia. **Conclusión:** en la revisión, no se encontraron artículos relacionados con ambulatorios y Hospitales Día. Los estudios seleccionados demuestran que el consumo de preparados alcohólicos para la higiene de manos es diferente según el perfil del sector y del paciente tratado y que tanto el volumen mínimo como las oportunidades no suelen ser considerados para el análisis del indicador.

Palabras clave*: Higiene de Manos. Antiinfecciones Locales. Atención Ambulatoria. Centros de Día. Indicadores de Salud.*

INTRODUCTION

Healthcare-associated infections (HAIs) increase patient morbidity and mortality and are the object of attention by the Hospital Infection Control Commissions (HICC).[1] Hand hygiene (HH) is directly associated with a reduction in infection rates, and it is a relatively simple measure. Despite this, there is not great compliance by professionals, which is a challenge for infection control.[2-4] Since 2004, the World Health Organization (WHO) has identified HAI as a patient safety issue, launching the "Clean Care is Safer Care" campaign in 2005,[5] and in 2009, the Multimodal Strategy was defined and disseminated to encourage compliance with HH,[2] ratifying the use of alcoholic preparations as a standard solution for hand antisepsis.[6]

Since then, one of the nine main WHO recommendations on HH in health services is the provision of access for health professionals to alcohol preparation at the point where care is provided,[6] guidance that was regulated in Brazil by RDC 42 of October 25, 2010,[7] and later by Technical Note 01/2018 GVIMS/GGTES/ANVISA.[8]

The use of alcoholic preparations is widely recommended, due to the ease of their distribution in the institution, and some studies indicate that their use increased health professionals' compliance with HH.[6] This increase may be related to advantages such as: elimination of most microorganisms (including viruses); short period of time to sanitize hands (20 to 30 seconds); product availability at the service point; good skin tolerability; no need for any special infrastructure, such as a clean water supply network, washbasin, among others.[9,10]

Furthermore, alcoholic preparations act quickly and have excellent bactericidal and fungicidal activity when compared to other agents used in HH. For these reasons, when alcohol-based hand rub is available, it should be adopted as the first choice product (when there is no visible dirt on the hands), being, in short, a recommendation with level of evidence IB in the WHO Guidelines on Hand Hygiene in Healthcare Services Health.[6] However, the elimination of the microbial load after HH with alcoholic preparation is directly related to the correct technique.[10-12]

The Multimodal Strategy also makes it mandatory to monitor HH practices through indicators, providing employees with feedback on performance and results.[13] In Brazil, the Protocol for the Practice of Hand Hygiene in Health Services, which is based on the Multimodal Strategy, defines the following indicators for measuring compliance: mandatory indicators: a) consumption of alcohol-based hand rub: monitoring of the volume of alcohol-based hand rub used for every 1,000 patients/day; b) soap consumption: monitoring the volume of liquid soap with or without antiseptic used for every 1,000 patients/day. Recommended indicator: c) percentage (%) of compliance: number of HH actions carried out by health professionals/number of opportunities for HH, multiplied by 100.[13] Measuring the degree of professionals' compliance with processes based on scientific evidence is necessary to demonstrate whether the efforts undertaken by the organization led to significant changes in the performance scenario. Monitoring makes health care more transparent as well as providing information to direct improvement initiatives.[14]

Monitoring the volume of alcohol preparation is an indirect method that helps institutions to monitor professionals' compliance with HH associated with direct observation, which is considered the gold standard.[15] It must be calculated using the formula: amount of alcoholic product used in the month in milliliters (ml) divided by the number of patients/day.[13,16] As for the ideal minimum consumption, the WHO, in the document Hand Hygiene Self-Assessment Framework 2010, brings in item 3.3c of the assessment and feedback questionnaire the following question: alcohol consumption for hands is at least 20 L per 1,000 patients/day?[17] Since then, health services have used the reference 20 ml per patient/day as a minimum goal to be achieved, as seen in studies related to the subject.[15, 18]

In 2014, the Collaborating Center for Quality and Patient Safety (Proqualis)[18] published the "Alcoholic Hand Preparation Consumption Sheet". In it, we can find the definition of patient/day as the patient care provided by a hospital day.[19] Therefore, the Standardization of Hospital Census Nomenclature manual, published by the Ministry of Health, defines "hospital day" as a 24-hour period between two consecutive hospital censuses. The censuses, in turn, are the counting and registration, each hospital day (24 hours), of the number of occupied and vacant beds in inpatient units and hospital services.[20] Regarding outpatient clinics, they are not considered hospital beds, since patients are treated on a non-hospitalization basis.

Given the fact that, currently, there is no guidance regarding the profile for application of the reference published by the WHO for many health institutions, the study sought to analyze information available in the scientific literature to support the definition of alcoholic preparation consumption for HH in outpatient institutions and Day Hospitals.

METHOD

This is an integrative review (IR) study, following the steps: 1) theme identification and research question selection; 2) establishment of criteria for inclusion and exclusion of studies; 3) definition of the information to be extracted from the chosen studies; 4) assessment of included studies; 5) interpretation of results; 6) review presentation.[21, 22]

The PICo (Problem, Interest and Context) strategy was used, where P: ideal consumption volume of alcoholic preparation for HH; I: evidence available for determination; Co: outpatient clinics and Day Hospitals. Thus, the research question was defined: what evidence is available in the scientific literature to define the value of alcohol consumption for HH in outpatient clinics and Day Hospitals?

To carry out the search in the databases, the following keywords were chosen, according to the structured and multilingual vocabulary of Descriptors in Health Sciences (DeCS): "*Segurança do Paciente*", "*Higiene das Mãos*", "*Anti-Infecciosos Locais*". The following Medical Subject Headings (MeSH) descriptors were also used: "Hand Hygiene"[Mesh], "Patient Safety"[Mesh], "Anti-Infective Agents, Local"[Mesh], "Infection Control"[Mesh]. Articles in Portuguese, English and Spanish, with content available in full, online and free of charge, published between 2010 and 2021, which were in accordance with the pre-established theme, were included. The choice of this period was due to the launch of the Multimodal Strategy to improve compliance with HH practices by the WHO. Editorials and news as well as articles in other languages, not available in full or free of charge, and that did not have thematic significance for the objectives of work, were excluded.

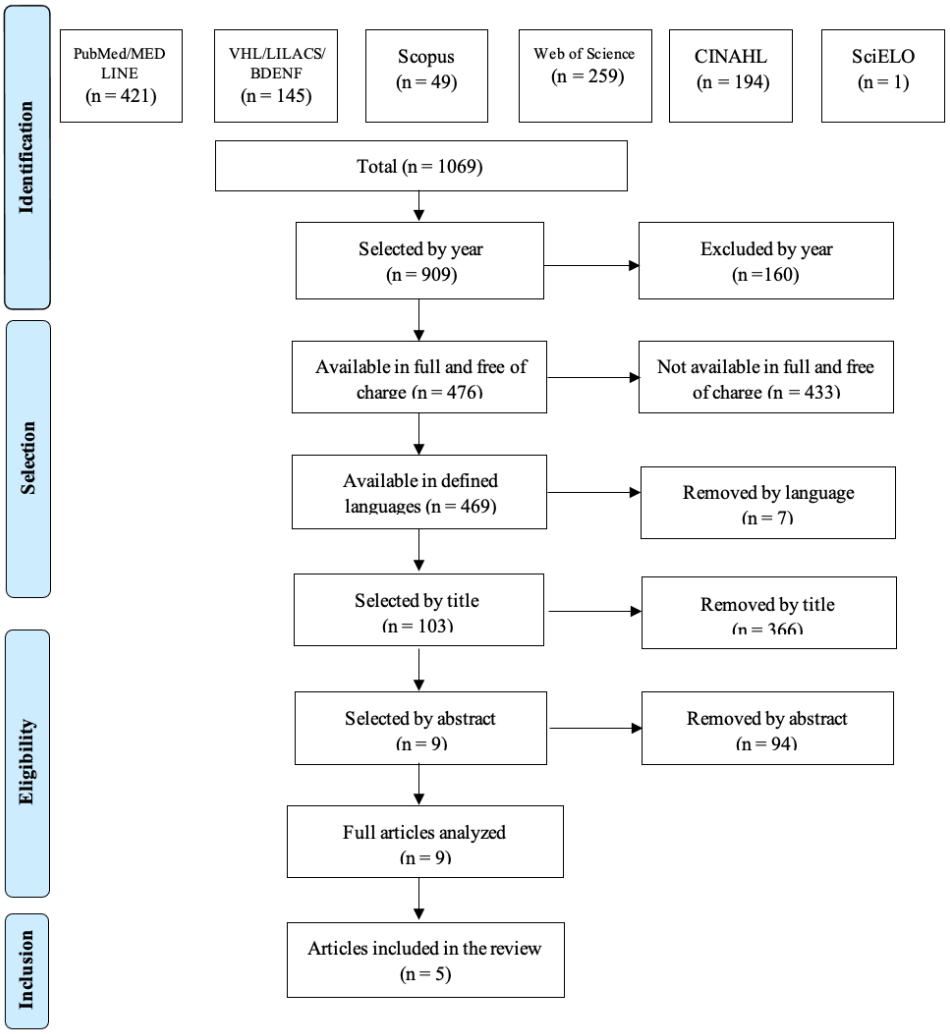
Materials published in events/conferences, technical materials and articles from the following journal databases of the Coordination for the Improvement of Higher Education Personnel (CAPES - *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*) were selected (www.periodicos.capes.gov.br) as follows: Scopus; Web of Science; SciELO; PubMed/MEDLINE; Cumulative Index to Nursing and Allied Health Literature (CINAHL); BDENF - Nursing Database (BDENF); and Latin American and Caribbean Literature on Health Sciences (LILACS), through the Virtual Health Library: VHL (BIREME). The search strategies used were organized with the help of a librarian and are described in Chart 01.

Searches in the databases were carried out by two researchers independently, between May and June 2021, and resulted in a total of 1069 articles. For selection, the analysis criteria shown in Flowchart 01 were used.

This process was carried out through a thorough reading of titles and abstracts, so that the studies that met the defined inclusion criteria, in addition to meeting the proposed objective, were selected for the final selection. For the final selection of the articles, a critical and detailed analysis was carried out in which we sought to identify what information was used to define the value of alcoholic preparation consumption for HH and the amount of ml used on average to perform an HH.

Chart 1. Search strategy applied in databases.

Database	Search Key
PubMed/MEDLINE	("Hand Hygiene"[Mesh] OR "Hand Hygiene"[All Fields]) AND ("Patient Safety"[Mesh] OR "Patient Safety"[All Fields] OR ("patient safety"[MeSH Terms] OR ("patient "[All Fields] AND "safety"[All Fields]) OR "patient safety"[All Fields] OR ("patient"[All Fields] AND "safeties"[All Fields]))) AND ("Anti-Infective Agents , Local"[Mesh] OR "Anti-Infective Agents, Local "[All Fields] OR "Antiseptics"[All Fields] OR ("anti-infective agents, local"[Pharmacological Action] OR "anti-infective agents, local" [MeSH Terms] OR ("anti-infective"[All Fields] AND "agents"[All Fields] AND "local"[All Fields]) OR "local anti-infective agents"[All Fields] OR ("local"[All Fields] AND " anti-infective "[All Fields] AND "agents"[All Fields])) OR "Topical Anti-Infective Agents"[All Fields] OR "Topical Anti Infective Agents"[All Fields] OR ("anti-infective agents, local"[Pharmacological Action] OR "anti-infective agents, local"[MeSH Terms] OR ("anti-infective"[All Fields] AND "agents"[All Fields] AND "local"[All Fields]) OR "local anti-infective agents"[All Fields] OR ("topical"[All Fields] AND " anti-infective "[All Fields] AND "agents"[All Fields])) OR "Local Anti-Infective Agents"[All Fields] OR "Local Anti-Infective Agents"[All Fields] OR "Infection Control"[Mesh] OR "Infection Control"[All Fields])
Scopus	ALL(("Hand Hygiene") AND ("Patient Safety" OR "Patient Safeties") AND ("Antiseptics" OR "Local Anti-infective Agents" OR "Topical Anti-Infective Agents" OR "Topical Anti Infective Agents" OR "Topical Anti-infective Agents" OR "Local Anti--Infective Agents" OR "Local Anti-Infective Agents" OR "Infection Control")) AND (LIMIT-TO (OA,"all ")) AND (LIMIT-TO (PUBYEAR,2021) OR LIMIT- TO (PUBYEAR,2020) OR LIMIT-TO (PUBYEAR,2019) OR LIMIT-TO (PUBYEAR,2018) OR LIMIT-TO (PUBYEAR,2017) OR LIMIT-TO (PUBYEAR,2016) OR LIMIT-TO (PUBYEAR,2015) OR LIMIT-TO (PUBYEAR,2011)) AND (LIMIT--TO (LANGUAGE,"English ") OR LIMIT-TO (LANGUAGE,"Spanish "))
Web of science	(("Hand Hygiene") AND ("Patient Safety" OR "Patient Safeties") AND ("Antiseptics" OR " Local Anti-infective Agents" OR "Topical Anti-Infective Agents" OR "Topical Anti-Infective Agents" OR "Topical Anti-infective Agents " OR "Local Anti-Infective Agents" OR "Local Anti-Infective Agents" OR "Infection Control"))
CINAHL	(("Hand Hygiene") AND ("Patient Safety" OR "Patient Safeties") AND ("Antiseptics" OR " Local Anti-infective Agents" OR "Topical Anti-Infective Agents" OR "Topical Anti-Infective Agents" OR "Topical Anti-infective Agents " OR "Local Anti-Infective Agents" OR "Local Anti-Infective Agents" OR "Infection Control"))
VHL (LILACS/BDENF)	("Hand Hygiene " OR "Higiene de las Manos" OR "Hand Hygiene") AND (" Patient Safety "OR" Patient Safeties " OR " Security del Patient" OR "Patient Safety") AND (" Anti-Infective Agents , Local " OR " Antiseptics " OR " Local Anti-infective Agents " OR "Topical Anti-Infective Agents " OR "Topical Anti Infective Agents " OR "Topical Anti-infective Agents " OR "Local Anti-Infective Agents " OR "Local Anti-Infective Agents "OR " Anti-infective Locales " OR "Local Antiinfectives " OR "Local Antiinfective Agents" OR "Topical Antiinfective Agents" OR "Antiseptic Agents" OR "Topical Antiinfective Drugs" OR "Antiseptics " OR "Local Antiinfective Drugs" OR "Local Microbicides" OR "Topical Microbicides" OR " Infection Control " OR " Infection Control " OR "Infection Control" OR "Infection Control ")
ScieLO	("Hand Hygiene " OR "Higiene de las Manos" OR "Hand Hygiene") AND (" Patient Safety "OR" Patient Safeties " OR " Security del Patient" OR "Patient Safety") AND (" Anti-Infective Agents , Local " OR " Antiseptics " OR " Local Anti-infective Agents " OR "Topical Anti-Infective Agents " OR "Topical Anti Infective Agents " OR "Topical Anti-infective Agents " OR "Local Anti-Infective Agents " OR "Local Anti-Infective Agents "OR " Anti-infective Locales " OR "Local Antiinfectives " OR "Local Antiinfective Agents" OR "Topical Antiinfective Agents" OR "Antiseptic Agents" OR "Topical Antiinfective Drugs" OR "Antiseptics" OR "Local Antiinfective Drugs" OR "Local Microbicides" OR "Topical Microbicides" OR " Infection Control " OR " Infection Control " OR "Infection Control" OR "Infection Control ")



Flowchart 01. Study selection process

RESULTS AND DISCUSSION

Five articles that address the theme were selected, but no article was found that specifically addressed outpatient clinics or Day Hospital. The English language was predominant, being presented in all publications. Two studies took place in a research environment in Hungary, and the others were conducted in other countries, covering Europe and Asia. As for the databases, one study was published in VHL, one in Scopus, one in CINAHL, and two in PubMed, with publications beginning in 2010 (1), and the others in 2013 (1), 2015 (2) and 2020 (1).

Subsequently, a synoptic table (Table 01) was elaborated, in order to synthesize the main information, and the articles were divided according to the variables related to the objective of this review, as ml of alcoholic preparation for each HH and consumption of alcoholic preparation per patient/day.

Although the studies do not contemplate contexts similar to Day Hospital and/or outpatient care, they provide relevant information to support the definition of alcoholic preparation consumption for HH and which were divided into two variables: ml of alcoholic preparation for each HH and alcoholic preparation consumption per PD. Of the five articles, two contained information related to both analytical categories: one only about the number of milliliters to be used for proper HH and two only about the alcoholic preparation consumption for HH identified in the institutions.

Through the analysis of the three articles that mention the amount of ml of alcoholic preparation for each HH, it was identified that the average volume predicted for a correct procedure is 3 ml,[22,23,24] however there is a caveat that for large hands this volume may be inadequate.[25,26] This brings a responsibility for professionals to judge, at the end of the HH technique, whether the amount of alcoholic preparation used was sufficient to cover the entire hand. If not, care should be taken to use a larger amount than that commonly available in dispensers. The NHSScotland National Infection Prevention and Control Manual states that the volume of alcohol preparation used should, in the absence of manufacturer instructions, be approximately 3 ml to ensure full coverage. The authors state that this volume is based on a series of experimental and observational studies, however the

Table 1. Articles surveyed in databases.

					Main results	
Authors and journal	**Data base/ Year**	**Article title**	**Institution profile**	**Study objective**	**ml of alcoholic preparation for each HH**	**Consumption of alcoholic preparation per patient/day**
Bánsághi S, Soule H, Guitart C, et al. Antimicrobial Resist infect Control	VHL (2020)	Critical Reliability Issues of Common Type Alcohol-Based Handrub Dispensers	Not directed to an institutional profile.	Investigate the dispensing performance of wall-mounted alcohol preparation dispensers commonly used in hospital environments.	They mention that both the European standard EN 1500 and the North American standard ASTM E-1174 require the application of 3 ml twice to wash hands.	
Reichard C, et al. J Hosp Infect	CINAHL (2013)	Three years of national hand hygiene campaign in Germany: what are the key conclusions for clinical practice?	No -ICU and ICU including pediatric.	Assess the impact of the multimodal strategy of in Germany after 3 years.	They also refer to a study that showed that at least 2 ml of alcoholic solution are needed to completely cover the entire surface of the hands, but 3 ml may be insufficient in the case of large hands, and that, definitely, a volume of ml cannot cover the entire surface of the hand.	The 2009 median across 543 ICUs was 83 ml per patient/day (PD), with a range of 43 to 141 ml/PD between the 10th and 90th percentiles. Median consumption in 3339 non-ICU was 18 ml/PD, with a range of 10 to 38 ml/PD between the 10th and 90th percentiles. The highest consumption was found in pediatric ICUs with a median of 99 against 68 ml/PD in other ICUs. They cite a few studies, one being where ICUs started at a baseline of 63.07 ml/PD and non-ICUs at 43.69 ml/PD. Another, in which baselines were 65.8 ml/PD for ICU and 14.7 ml/PD for non-ICU. (to be continued...) However, soap consumption was also recorded. Another measured a baseline intake of 66.6 ml/PD in a pediatric ICU. Another measured a median of 87 ml/PD in five different ICUs, with a range of 57 to 102 ml/PD.
Sakamoto F, et al. Am J Infect Control	PubMed / Medline (2010)	Increased use of alcohol-based hand sanitizers and successful eradication of methicillin-resistant Staphylococcusaureus from a neonatal intensive care unit: A multivariate time series analysis	NICU	Assess the relationship between infection incidence density rates, amount of alcohol-based hand sanitizers per patient-nurse, and bed occupancy rates.		The combined average of alcohol-based hand sanitizers used (milliliters) for 1 patient per day during the study period was 11.6 ml. The monthly value stayed below 10 ml per PD until it rose sharply to 22.0 ml per PD one month after the MRSA incidence, and reached its highest level of 25.9 ml per 1000 PD. After that, the amount remained around 15.0 ml per PD.
Szabó R., et al. Antimicrob Resist Infect Contro	PubMed / Medline (2015)	Use of hand hygiene agents as a surrogate marker of compliance in Hungarian long-termcare facilities: first nationwide survey	Nursing Homes (NH)	Provide an overview of the first baseline data collected on alcohol-based hand sanitizers and antiseptic soap consumption as surrogate markers for HH compliance by health workers in Hungarian NH.	3 ml is the recommended amount of alcohol-based hand sanitizer for one HH. 5 ml is the recommended amount of antimicrobial soap for one hand wash.	In total, the average annual consumption of alcohol and antimicrobial soap was 2.2 ml (interquartile range (IQR), 0.4 -9.1 ml) and 12.1 ml (IQR), 0.7 - 32.8 ml) per HH by health professionals, respectively.
Hansen S, et al. Clin Microbiol Infect.	Scopus (2015)	Provision and consumption of alcohol-based hand rubs in European hospitals	General Hospital, ICU and Non-ICU	Assess the provision and consumption of alcohol-based hand care products in European hospitals.	Average volume of 3 ml of alcoholic preparation for each hand hygiene action.	Mean consumption of 21 ml (IQR 9 – 37 ml) per PD (PD) at hospital level; 66 ml/PD (IQR 33 –103 ml/PD) at the ICU level; and 13 ml/PD (IQR 6 –25ml/PD) at the non-ICU level.

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same study demonstrated that, in practice, the volume of alcoholic preparation used per HH opportunity in the National Health Service (NHS) is probably closer to 1 ml.[27]

In a multimodal intervention in South Africa, the reference of 3 ml per HH opportunity was also used for measurement[28] and, likewise, in the context of Primary Care in the Faranah region, Guinea. In this analysis, a clear underutilization was identified, with an average of 0.77 ml per consultation, compared to the recommended minimum amount of 3 ml per HH[29]. The authors inferred that, as low consumption was accompanied by relatively high compliance in terms of the number of HH actions, the most plausible explanation for the general underuse of alcoholic solution was due to the use of a small amount of alcoholic solution per HH action, and not a few HH actions per consultation, which could be explained by the lack of knowledge of the required amount or the desire not to 'waste', for fear of interruption of supply[30]. This point evokes the need for greater disclosure of the minimum amount of alcoholic preparation for effective HH and its relationship with the assessment of the representativeness of consumption measured by the HICC.

When assessing the findings on the average alcoholic preparation consumption per PD, it is noticed the prevalence of studies in general hospitals in ICU and non-ICU, which may be related to the fact that patients of greater complexity demand more care and interventions. Only one study brought a different perspective, related to alcoholic preparation consumption in a Hungarian NH, but the measurement used different markers, being by "health professional" and not by "PD". It is worth mentioning that none of the authors mentioned the goal of 20 ml PD, published by the WHO in the document Hand Hygiene Self-Assessment Framework 2010 (HHSAF).[17]

Analyzing other studies on alcoholic preparation consumption, it was identified that, in the Neonatal Intensive Care Unit (NICU) of the largest maternity hospital in the state of Bahia, the monthly average use of alcoholic preparation for HH was 16.341 ml. The authors report that the HICC carried out the monthly calculation of the minimum expected consumption in ml, according to WHO criteria, and the value 46.640 ml was used as a reference parameter,[17] however, they did not explain the method they used to define this reference higher than that predicted by the WHO, but we can infer that, in this sector, the opportunities for HH are greater than in the others.

In a pre-hospital emergency service in Goiás,[30] a consumption of 2.071 ml of alcoholic preparation was found for an average of 750 occurrences assisted, about 2.76 ml per service provided, slightly below the amount of ml minimum for a proper HH. After the educational activity proposed in the referenced article, there was an increase to about 6.02 ml of alcoholic preparation per visit, suggesting the performance of two HH. However, considering that emergency medical service professionals work minimally in pairs, the "5 moments for HH" and the goal published by the WHO, we can infer that compliance with HH by professionals is low, which may be related to the challenges due to the structural conditions of ambulances and the service profile. As in the case of outpatient clinics and Day Hospitals, this report makes us reflect on how assertively the WHO consumption reference is applicable to the most diverse health services, since HH opportunities differ according to the type of service and complexity.

In 2007, a voluntary electronic surveillance tool was introduced in German healthcare institutions to record alcoholic preparation consumption and determine consumption trends between 2007 and 2018. Thus, 75.2% of intensive care hospitals in Germany (N = 1,460) participated. In 2018, the average consumption results obtained were: in the ICUs (n =1,998), 137.4 ml per PD; in intermediate care units (N = 475); 70.6 ml per PD; and in the wards, 32.6 ml per PD.[31] It is noticed that, the greater the complexity of care, the more opportunities for HH there are, reflecting on the increase in alcoholic preparation consumption by PD.

In a retrospective analysis comparing the results of two surveillance systems implemented (WHO HHSAF and alcoholic solution consumption) in 40 hospitals in the Piedmont region of Italy, there was a positive correlation between the HHSAF score and the chance of belonging to the high alcohol consumption group, mainly for cut-offs of 19 to 23 ml per PD. Two alcohol solution consumption peaks were identified at approximately 10 and 22 ml per PD, corresponding to median scores of 353.75 and 375 points, respectively.[32]

The maximum score considered for the HHSAF is 500 points. The article makes us reflect on authors' assertion that both surveillance systems are consistent and that the HHSAF score "may function as a reasonable predictor of compliance with HH in health settings".[32]

In the African study, carried out between 2020 and 2021 on a multimodal intervention in a NICU, the baseline volume of alcoholic preparation use was 70 ml per PD, about 23 HH actions per PD and 73 ml per PD after the intervention. The initial HHSAF score was 165, classifying the unit as a "basic" level, evolving to 262.5, becoming classified as an "intermediate" level".[27] This shows us that a high score level on the HHSAF does not necessarily reflect on compliance with HH.

Still, thinking about the HHSAF's education pillar, a study conducted at NHO Shimoshizu national hospital, with 440 beds, located in Chiba, Japan, identified that the 5-year initiative implemented resulted in an eightfold increase in alcoholic solution consumption, from 4.2 to 34.4 ml per PD.[33] Even if the HHSAF is not a tool that correctly explains professionals' compliance, its application is essential as a strategic basis to generate a favorable environment and culture for this to happen, which is its main purpose.[17]

Assessing the final consumption achieved after the initiative, three other studies corroborate the result, showing an average consumption of approximately 35 ml per PD in Japanese intensive care services,[34] 32 ml per PD in three ICUs of a private hospital in Minas Gerais[35] and 36.4 ml per PD in a Sub-Intensive Care Unit of an Italian general hospital.[36]

In the same context, an analysis carried out at Faranah Regional Hospital to assess the WHO HH improvement strategy's feasibility and effectiveness in this resource-poor setting, identified that the mean monthly alcohol consumption for the entire hospital increased after the intervention, from 2.2 L at baseline to 28.0 L at follow-up.[37] A total of 24 months of HH data were reviewed, and converted to liters per 1000 PD. The total consumption of alcoholic solution was 18,693 L, ranging from 30.1 to 72.6 ml per PD per ward.[38] The Multimodal Hand Hygiene Improvement Strategy is clearly a way to encourage the creation of a HH culture in health organizations.[6]

The heterogeneity of alcoholic preparation consumption in the different sectors of health establishments is evident (lower consumption identified in studies: 2.76 ml per service provided; higher consumption identified in the studies: 137.4 ml PD), and even in those that reach better levels, it is not possible to state that consumption is adequate. There is a latent need to define the minimum consumption of alcoholic solution expected in all types of health services based on the "5 moments for HH", in order to make the correlation of these data with practice more and more reliable. This logic was applied in a study carried out at The Ottawa Hospital, in Ontario, which aimed to estimate the total volume of alcoholic preparation needed for HH during a year, based on the estimated number of HH indications at each point of care.[38] The definition of opportunities was carried out through the number of HH indications signaled in the audits and through interviews with frontline professionals, bringing more reliable data for comparison between current and ideal consumption. In another article, researchers reported that, in France, the alcoholic preparation consumption index is calculated considering the actual HH expected per day and per patient category, and, based on a volume of 3 ml per HH, an expected annual consumption is calculated.[39] Measuring volumetry in isolation, without a reference that considers the minimum HH opportunities expected during a given service, does not add real value to practice. Through this data, it is possible to understand where one is, but not where one intends to go and how far away we are. In this way, the identification of the expected minimum consumption of alcohol preparation can contribute to greater assertiveness in the planning of actions to increase the compliance of professionals with HH in all health services, including outpatient clinics and Day Hospitals. Moreover, investments in infrastructure, provision of alcohol preparation at the point of care, training and adequate sizing of employees are necessary. It is possible that the results presented by health institutions are less than ideal, due to the imbalance between these crucial factors.

CONCLUSION

Alcoholic preparation consumption for HH is still a controversial subject. when discussing the minimum consumption by health services, and with scarce information, when it comes to outpatient clinics and Day Hospitals. The study sought to analyze the information available in the literature to support the definition of alcoholic preparation consumption for HH in these institutions, but no articles were found in relation to this specific context. However, the data identified on the minimum amount of ml of alcoholic preparation for each HH pave the way for further research on the subject, which can be associated with the mapping of HH opportunities in each care situation.

This need is evident, especially in the outpatient and Day Hospital scope, since the published studies are commonly related to general hospitals and concentrated in sectors with a higher risk of infection. However, less complex environments also present risks and require evidence to support best practices, subsidizing the critical analysis of the success of implemented infection prevention actions, such as HH.

The main limitation of this study was the use of restricted descriptors, which may have interfered with the findings. However, we understand that this text brings up an important discussion for assistance in health services in general, not just for outpatient clinics and Day Hospital, opening doors for primary studies. Therefore, it is suggested that studies relating the type of health unit, the profile of patients and the "5 moments for HH" be carried out, bringing assertiveness and reliability regarding the minimally expected alcoholic preparation consumption, allowing institutions to better measure the efforts necessary for its achievement.

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All authors approved the final version to be published, and are responsible for all aspects of the work, including ensuring its accuracy and integrity.