



The burden of diarrhea in the intensive care unit (ICU-BD). A survey and observational study of the caregivers' opinions and workload



Claudia-Paula Heidegger^{a,1}, Séverine Graf^{a,b,1}, Thomas Perneger^c,
Laurence Genton^b, Taku Oshima^b, Claude Pichard^{b,*}

^a Division of Intensive Care, Geneva University Hospitals, 1211 Geneva, Switzerland

^b Clinical Nutrition Unit, Geneva University Hospitals, 1211 Geneva, Switzerland

^c Division of Clinical Epidemiology, Geneva University Hospitals, 1211 Geneva, Switzerland

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ABSTRACT

Background: Diarrhea as a common complication affects 14% patients in our intensive care unit. Risk factors for diarrhea and its clinical consequences for patients are well known, but the impact of diarrhea on caregivers' workload remains undocumented.

Objectives: This study aims at establishing the impact of diarrhea on costs and human burden in intensive care unit caregivers.

Design: A survey and observational study.

Settings: A mixed 36-bed medical and surgical intensive care unit.

Participants: All intensive care unit caregivers (nurses and nursing aides).

Methods: A questionnaire was designed by a multidisciplinary team and completed by intensive care unit caregivers analyzing the clinical and human impact of diarrhea on their workload. Time measurements for the management of liquid stools were performed. Human related costs of diarrhea were analyzed according to caregivers' years of clinical experience. **Results:** Questionnaires were completed by 146 of 204 intensive care unit caregivers (75% nurses; 73% nursing aides). Dealing with diarrhea patients is a painful aspect of their work (69% nurses) with tiredness as main feeling and a source of conflict or misunderstanding among caregivers. The mean time measurement for managing one liquid stool in 50 diarrhea episodes was 17 min and 33 s, involving an average of 1.4 nurses and 0.8 nursing aides. Average human resources cost burden was 26.60 CHF per liquid stool.

Conclusion: Dealing with diarrhea increases workload for intensive care unit caregivers with consequences on their well-being. Human related costs of diarrhea are substantial and highlight the economic burden of diarrhea episodes in the intensive care unit. A multidisciplinary approach and specific protocols could positively impact the burden of diarrhea in the intensive care unit.

Trial registration: Clinical Trials gov NCT01922570.

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Abbreviations: ICU, intensive care unit; EN, enteral nutrition; CHF, Swiss francs.

* Corresponding author at: Clinical Nutrition, Geneva University Hospital, Rue Gabrielle-Perret-Gentil 4, 1211 Geneva 14, Switzerland.
Tel.: +41 22 372 93 44; fax: +41 22 372 93 63.

E-mail addresses: Claudia-paula.heidegger@hcuge.ch (C.-P. Heidegger), Severine.graf@hcuge.ch (S. Graf), Thomas.perneger@hcuge.ch (T. Perneger), Laurence.genton@hcuge.ch (L. Genton), Oshima.Taku@hcuge.ch (T. Oshima), Claude.pichard@hcuge.ch (C. Pichard).

¹ These authors equally contributed to this work.

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What is already known about the topic?

- Intensive care unit patients suffer from diverse gastrointestinal symptoms with diarrhea as a common observation. Diarrhea prevalence is highly variable according to the center and the definition chosen.
- The occurrence of diarrhea in the intensive care unit is often associated with enteral nutrition besides other etiologies (infections, intestinal surgery and treatments).
- The development of diarrhea may induce major complications for the patient and may impact his clinical outcome.

What this paper adds

- Diarrhea in the critically ill patients has a negative impact on the workload and well-being of intensive care unit caregivers.
- Diarrhea in critically ill patients increases the workload and the manpower-related costs in the intensive care unit.
- Multidisciplinary diarrhea management protocols in the intensive care unit, as well as better-adapted materials and equipment for the management of diarrhea patients are mandatory.

1. Introduction

Patients treated in the Intensive Care Unit (ICU) require complex care and they may suffer from a number of gastrointestinal (GI) symptoms during their ICU stay, with diarrhea as a common observation (Luft et al., 2008; Reintam Blaser et al., 2015; Reintam et al., 2009). The prevalence of diarrhea is highly variable in the ICU population (5–70%) according to the center and definition chosen (Ferrie and East, 2007; Jack et al., 2010; Luft et al., 2008; Reintam et al., 2009; Whelan et al., 2009). This high variability may be explained by the lack of consensus to define diarrhea (Whelan et al., 2003). In the current literature, there are multiple definitions of diarrhea (based on stool weight, frequency, color, consistency etc.) but the most common definition for ICU patients are at least three, loosed or liquid stools per day (Ferrie and East, 2007; Reintam Blaser et al., 2013, 2015; Reintam et al., 2009; Thibault et al., 2013). This definition is also used by the World Health Organization (World Health Organisation, 2005) and seems to be the most practical one in routine use.

The occurrence of diarrhea in the ICU is often associated with enteral nutrition (EN) (Mentec et al., 2001; Montejo, 1999; Whelan et al., 2009), besides other etiologies such as treatments (e.g. antibiotics, laxatives etc.), infections (e.g. *Clostridium difficile*) and intestinal surgery. In a recent study, the incidence of diarrhea was 14% during the first 2 weeks of ICU stay in a mixed population of a tertiary ICU (Thibault et al., 2013). We showed that EN covering more than 60% of the energy target is a risk factor for developing diarrhea (relative risk = 1.75) and identified other risk factors like the concomitant use of antimicrobial drugs

which further increased the incidence of diarrhea (Thibault et al., 2013).

The development of diarrhea may induce major dehydration and electrolyte disturbances resulting ultimately in cardiac arrhythmias. Furthermore, patients with diarrhea develop commonly skin irritations that can lead to bedsores (Finne-Soveri et al., 2008). The frequent nursing hygiene care of diarrhea patients is also the source of complications, with a significant risk of pulling the patient's medical equipment (catheters, endotracheal tubes etc.) and a higher risk of catheter contamination by stool. Moreover, the discomfort of conscious patients is likely to be significantly increased in case of diarrhea.

One can easily imagine that dealing with diarrhea also increases the burden of work for ICU caregivers. Unfortunately, the literature on this topic is very scarce. Therefore, we conducted this observational study with the main objective to evaluate the time required to take care of ICU patients with diarrhea and to assess the financial impact on the workload of ICU caregivers dealing with diarrhea. We also sought to assess the perception of the workload and the reactions of caregivers facing the problem of diarrhea.

2. Materials and methods

2.1. Subjects and design

This survey was conducted as an observational study to improve healthcare management in the ICU by assessing the time spent for dealing with diarrhea and by describing the impact of diarrhea on caregiver's work. The Ethics Committee of the Geneva University Hospital approved this study and waived the need for a written consent as this study entailed minimal risk and was part of a quality improvement project. The study was registered in Clinical Trials.gov NCT01922570.

2.2. Material and techniques

2.2.1. Cross-sectional survey: questionnaire on caregiver's opinion about diarrhea in ICU patients of a tertiary care hospital

The questionnaire was developed during a multidisciplinary meeting including ICU nurses, a clinical nurse specialist, dieticians, critical care physicians, and was reviewed by an epidemiologist. It was created only for this study, to record the feeling of the nurses and nursing aides dealing currently with diarrhea in the intensive care. The questionnaire was then pretested in 10 ICU caregivers for comprehension, and ease of use, changes were done for better comprehension including the suggestions of the 10 pretested ICU caregivers. Before sending the questionnaire to all ICU nurses and nursing aides, it has been reviewed a second time by the epidemiologist. The questionnaire was composed of 33 questions, grouped into four items concerning diarrhea (context, workload, feelings, and action). The expected responses for the first thirty-two questions were in the form of semantic scales or

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