Intensive and Critical Care Nursing (2016) 35, 45—51

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/iccn

ORIGINAL ARTICLE

# Outcomes and nursing workload related to obese patients in the intensive care unit

**Fernanda Souza Angotti Carrara**[a,*], **Suely Sueko Viski Zanei**[b], **Mariana Fernandes Cremasco**[c], **Iveth Yamaguchi Whitaker**[b]

[a] *São Paulo Hospital — University Hospital at Federal University of São Paulo — UNIFESP, Rua Doutor Diogo de Faria, 816, 04037-002 São Paulo, Brazil*
[b] *Paulista Nursing School, Federal University of São Paulo, UNIFESP, Rua Napoleão de Barros, 754, Vila Clementino, 04024-002 São Paulo, SP, Brazil*
[c] *Intensive Care Nursing, Hospital Israelita Albert Einstein, São Paulo, Brazil*

Received 21 October 2014; received in revised form 31 July 2015; accepted 27 December 2015

**KEYWORDS**
Body mass index;
Intensive care unit;
Nursing care;
Obesity;
Workload

**Summary**
*Objectives:* To compare the morbidity and mortality of patients with a body mass index (BMI) < and ≥30 kg/m$^2$ and to identify risk factors related to death and length of stay of obese patients in the intensive care unit (ICU).
*Methods:* Prospective and cross-sectional study.
*Setting:* A 35-bed mixed ICU in São Paulo, Brazil.
*Results:* The sample consisted of 530 patients, of which 105 (19.8%) had a BMI ≥30 kg/m$^2$. A significantly higher number of obese patients were female ($p = 0.025$). The mortality, morbidity and nursing workload were not different between the obese and nonobese groups. However, the morbidly obese patients were younger ($p < 0.001$), had a lower Charlson Comorbidity Index (CI; $p = 0.002$), lower Simplified Acute Physiology Score 3 (SAPS 3; $p = 0.047$), lower Sepsis-related Organ Failure Assessment (SOFA) score ($p = 0.019$), shorter ICU length of stay (LOS; $p = 0.015$) and hospital LOS ($p = 0.039$), and an increased mean nursing workload (Nursing Activities Score (NAS; $p = 0.004$)). The SOFA score and nursing workload were identified as risk factors associated with death in the ICU. These two variables, in addition to the admission category and duration of mechanical ventilation (MV), were also related to the ICU LOS, which demonstrates an inverse relationship between the NAS and LOS.

* Corresponding author at: Rua Doutor Diogo de Faria, 816, 04037-002 São Paulo, SP, Brazil. Tel.: +55 11984573806; fax: +55 1155394969.
*E-mail addresses:* fercarrara@hotmail.com (F.S.A. Carrara), suelyzanei@unifesp.br (S.S.V. Zanei), maricremasco@yahoo.com.br (M.F. Cremasco), iveth.whitaker@unifesp.br (I.Y. Whitaker).

http://dx.doi.org/10.1016/j.iccn.2015.12.003

*Conclusion:* Although the morbidity, mortality and nursing workload were not significantly different between the obese and nonobese groups, our results contribute additional information to the relationship between obesity and clinical discharge and inform future research.


**Implications for Clinical Practice**

- The increased prevalence of obesity in the population is associated with harmful effects on health, which may increase the frequency of obese patient admissions to the hospital and intensive care units (ICUs).
- Knowledge of the peculiar characteristics of the critically obese population is important to provide services that meet specific demands of the intensive care patient.
- The appropriate number of nurses is critical to avoid injury, ensure patient safety and reduce cost to the patient and the healthcare team.
- The prevalence of obesity was 19.8%, the majority of patients were women. The obese III group presented a mean Nursing Activities Score (NAS) of 70.6%, which was significantly higher ($p = 0.004$) in relation to the other obese groups. The Sepsis-related Organ Failure Assessment (SOFA) and nursing workload were risk factors for death among obese patients in the ICU. In addition, the SOFA score, nursing workload, type of patient and duration of mechanical ventilation (MV) were associated with the ICU length of stay (LOS) of obese patients.
- To facilitate care in obese patient mobilisation without causing occupational injuries, ergonomic training of staff and the development of protocols for safe care are necessary.

## Introduction

Obesity is a serious public health problem and its prevalence has increased in recent years. The World Health Organization (WHO) defines obesity as a body mass index (BMI) greater than or equal to 30 kg/m$^2$. Between 1980 and 2008, the prevalence of obese individuals worldwide has almost doubled, and 2.8 million people die each year as a direct result of overweight and obesity (WHO Statistics, 2012). In 2010, the International Association for the Study of Obesity/International Obesity Taskforce — IASO/IOTF — estimated that approximately 1 billion adults were overweight and 475 million were obese (IASO/IOTF, 2010). In Brazil, the prevalence of obesity is 17.5%, in the United States it is 34% and 20% in Europe (Pan American Health Organization, 2012; VIGITEL, 2014; WHO, 2013).

The increased prevalence of obesity in the population is associated with harmful effects on health, which may increase the frequency of admission of obese people to hospital intensive care units (ICU).

Obese patients are more likely to suffer complications during their stay in the ICU; however, studies have shown that the mortality rate of obese patients changes according to the study method and admission category (Miehsler, 2010; Oliveros and Villamor, 2008; Pelosi and Gregoretti, 2010). Additionally, studies have shown that obese patients remain on mechanical ventilation (MV) longer and have a longer length of stay (LOS) in the hospital. However, these results were not significant compared to nonobese patient groups (Akinnusi et al., 2008; Goulenok et al., 2004; Ray et al., 2005).

Additional aspects may also differ between obese and nonobese patients, such as mobility limitations, the risk of skin breakdown and healing processes of wounds, which may increase hospital LOS and the occurrence of adverse events. Furthermore, the increase in adipose mass in obese patients can interfere with the pharmacokinetic effects of medicines, such as their distribution, metabolism or half-life (Joffe and Wood, 2007). Additionally, the volume of distribution for highly lipophilic drugs is unpredictable (Cheymol, 2000). Such situations could generate unpredictable events that could affect the therapeutic response and the clinical outcomes of obese patients (Marik and Varon, 1998).

Considering the increase in obesity worldwide and the scarcity of Brazilian studies (Moock et al., 2010) related to obese patients in the ICU, this study was conducted with the aim of comparing the morbidity and mortality of patients with a BMI <30 kg/m$^2$ and ≥30 kg/m$^2$ and to identify risk factors related to death and LOS of obese patients in the ICU.

## Methods

### Design

This prospective and cross-sectional study was developed in the ICU of the University Hospital at the Federal University of São Paulo, Brazil. The number of beds was 35 in this mixed medical/surgical ICU. This study received approval from the local institutional review board.

The criteria for including patients in the sample were the following: >18 years old, registered weight within 24 hours after being admitted to the ICU and LOS in the ICU longer than 24 hours. Pregnant women, patients with ascites or brain death on admission and patients who were readmitted to the ICU were not included.