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SCIENTIFIC ARTICLE

Bacterial colonization due to increased nurse workload in an intensive care unit

Ilker Onguc Aycan[a,*], Mustafa Kemal Celen[b], Ayhan Yilmaz[c], Mehmet Selim Almaz[d], Tuba Dal[e], Yusuf Celik[f], Esef Bolat[g]

[a] *Department of Anestesiology and Reanimation, Dicle University Hospital, Diyarbakir, Turkey*
[b] *Department of Infection Diseases, Dicle University Hospital, Diyarbakir, Turkey*
[c] *Department of Anestesiology and Reanimation, Women Health and Gynecological Hospital, Diyarbakir, Turkey*
[d] *Anestesiology and Reanimation, Lice States Hospital, Diyarbakir, Turkey*
[e] *Department of Microbiology, Dicle University Hospital, Diyarbakir, Turkey*
[f] *Department of Biostatistic, Dicle University Hospital, Diyarbakir, Turkey*
[g] *Department of Anestesiology and Reanimation, Bozok University Hospital, Yozgat, Turkey*

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Understaffing;
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Abstract
Introduction: The rates of multiresistant bacteria colonization or infection (MRB+) development in intensive care units are very high. The aim of this study was to determine the possible association between the risk of development of nosocomial infections and increased daily nurse workload due to understaffing in intensive care unit.
Methods: We included 168 patients. Intensity of workload and applied procedures to patients were scored with the Project de Recherché en Nursing and the Omega scores, respectively. The criteria used for infections were those defined by the Centers for Disease Control.
Results: Of the 168 patients, 91 (54.2%) were female and 77 (45.8%) were male patients. The mean age of female and male was 64.9 ± 6.2 years and 63.1 ± 11.9 years, respectively. The mean duration of hospitalization in intensive care unit was 18.4 ± 6.1 days. Multiresistant bacteria were isolated from cultures of 39 (23.2%) patients. The development of MRB+ infection was correlated with length of stay, Omega 1, Omega 2, Omega 3, Total Omega, daily PRN, and Total PRN ($p < 0.05$). There was no correlation between development of MRB+ infection with gender, age and APACHE-II scores ($p > 0.05$).
Conclusion: The risk of nosocomial infection development in an intensive care unit is directly correlated with increased nurse workload, applied intervention, and length of stay. Understaffing in the intensive care unit is an important health problem that especially affects care-needing patients. Nosocomial infection development has laid a heavy burden on the economy of many countries. To control nosocomial infection development in the intensive care unit, nurse workload, staffing level, and working conditions must be arranged.

* Corresponding author.
E-mail: ilkeraycan@hotmail.com (I.O. Aycan).

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PALAVRAS-CHAVE
Falta de pessoal;
Carga de trabalho;
Enfermagem;
Bactérias multirresistentes

Colonização bacteriana por causa do aumento da carga de trabalho da equipe de enfermagem em unidade de terapia intensiva

Resumo
Introdução: As taxas de desenvolvimento de infecção ou colonização por bactérias multirresistentes (BMR+) em unidades de terapia intensiva são muito elevadas. O objetivo deste estudo foi determinar a possível associação entre o risco de desenvolvimento de infecções hospitalares e o aumento da carga de trabalho diária da equipe de enfermagem devido à insuficiência de pessoal em unidade de terapia intensiva.
Métodos: Cento e sessenta e oito pacientes foram incluídos. O volume da carga de trabalho e os procedimentos realizados em pacientes foram avaliados com o uso de instrumentos de medidas como o Projeto de Pesquisa em Enfermagem (*Project de Recherché en Nursing*) e o Omega, respectivamente. Os critérios usados para definir infecções foram os definidos pelos Centros de Controle de Doenças.
Resultados: Dos 168 pacientes, 91 (54,2%) eram do sexo feminino e 77 (45,8%) do sexo masculino. As médias das idades de mulheres e homens foram $64,9 \pm 6,2$ e $63,1 \pm 11,9$ anos, respectivamente. A média do tempo de internação em unidade de terapia intensiva foi de $18,4 \pm 6,1$ dias. As bactérias multirresistentes foram isoladas a partir de culturas de 39 (23,2%) pacientes. O desenvolvimento de infecção por BMR+ foi correlacionado com tempo de internação, Omega 1, Omega 2, Omega 3, Omega total, PPE diário e PPE total ($p < 0,05$). Não houve correlação entre desenvolvimento de infecção por BMR+ e gênero, idade e escores no APACHE-II ($p > 0,05$).
Conclusão: O risco de desenvolvimento de infecção hospitalar em unidade de terapia intensiva está diretamente relacionado com o aumento da carga de trabalho de enfermagem, as intervenções praticadas e o tempo de internação. A falta de pessoal em unidade de terapia intensiva é um problema de saúde importante que afeta principalmente os pacientes que requerem cuidados. A infecção hospitalar colocou um fardo pesado sobre a economia de muitos países. Para controlar o desenvolvimento de infecção hospitalar em UTI, a carga de trabalho de enfermagem, a composição do pessoal e as condições de trabalho devem ser organizadas.

Introduction

Nosocomial infections (NIs) are commonly observed in intensive care units (ICUs). Recommended conducts to avoid and control the spread of NI have been published, including measures to make it as multiresistant bacteria (MRB).[1,2] NI have well-documented adverse effects on attributable mortality and morbidity, length of stay (LOS), and hospital costs. Fewer data are available on the effects of NI on workload of nurses. Most studies of extra costs related to personal charges based their cost estimates on the attributable excess of hospital LOS.[3–7] Although the increase in LOS associated with NI is an important provenance of extra costs, it fails to reflect the effects of NI on the daily workload of nurses and therefore is not enough for determining staffing requirements.

Evaluation of the effects of NI on nurse workload is difficult because the relation between these two parameters is complex. Understaffing and a compact nurse workload can be viewed as a risk factor for NI or as an effect of NI.

On one hand, excessive nurse workloads have been shown to contribute to recurrent NI outbreaks; moreover, in a certain patients, a persistently high level of therapeutic activity may be a risk factor for NI.[8–10] On the other hand, NI can increase the severity of illness in the patient, and consequently the level of therapeutic activity, and requires stepped-up infection control procedures, especially when the causative organism is an MRB, both adding to the nurse workload.[10] These aspects of the daily workload should be considered when the quest is to match staffing patterns to both the number of patients and the level of care in each patient. The scoring systems able of measuring these aspects are needed.

The aim of this study was to determine the possible association between the risk of development of NIs and increased daily nurse workload due to understaffing in ICU, and to find out the risk factors in development of MRB colonization in patients with and without MRB colonization using Omega score[10] and Project de Recherché en Nursing (PRN) systems.[11]

Methods

A retrospective study has been conducted in a 15-bed medical ICU in the General Intensive Care Unit of the Diyarbakir Memorial Hospital in Diyarbakir, Turkey, between October 1, 2012 and March 31, 2013. The study protocol