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**ESCOLA DE MEDICINA
PÓS-GRADUAÇÃO EM CIÊNCIAS DA SAÚDE**

TESE DE DOUTORADO

**EFEITOS DO ISOLAMENTO DE CONTATO POR BACTÉRIAS
MULTIRRESISTENTES NOS NÍVEIS DE ANSIEDADE E DEPRESSÃO DOS
PACIENTES**

CURITIBA

2020

ELINE MARIA DE OLIVEIRA GRANZOTTO

**EFEITOS DO ISOLAMENTO DE CONTATO POR BACTÉRIAS
MULTIRRESISTENTES NOS NÍVEIS DE ANSIEDADE E DEPRESSÃO DOS
PACIENTES**

Tese apresentada ao Programa de Pós-Graduação em Ciências da Saúde da Escola de Medicina, da Pontifícia Universidade Católica do Paraná, como requisito parcial à obtenção do título de Doutora.

Orientador: Prof Dr Felipe Francisco Tuon

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**ATA DA SESSÃO PÚBLICA DE EXAME DE TESE DO PROGRAMA DE PÓS-GRADUAÇÃO
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Aos 20 dias do mês de março de 2020 às 14:00, realizou-se a sessão pública de Defesa de Tese “Efeitos do Isolamento de Contato por Bactérias Multirresistentes nos Níveis de Ansiedade e Depressão dos Pacientes” apresentado por **Eline Maria De Oliveira Granzotto** para obtenção do título de Doutor; Área de concentração: Medicina e áreas afins.

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*“lute com determinação abrace a vida com
paixão, perca com classe e vença com
ousadia, porque o mundo pertence a
quem se atreve e a vida é muito bela para
ser insignificante”*

Charles Chaplin

RESUMO

GRANZOTTO, E. M. de O. Efeitos do isolamento de contato por bactérias multirresistentes nos níveis de ansiedade e depressão dos pacientes. Tese - Pontifícia Universidade Católica do Paraná - Escola de Medicina - Pós-Graduação em Ciências da Saúde. Curitiba, 2019.

Precauções de contato em pacientes com Organismo resistente a múltiplos fármacos (MDRO) tem sido associado com efeitos adversos aos pacientes, incluindo ansiedade e depressão. O alvo deste estudo foi avaliar a presença e nível de ansiedade e depressão através de diferentes escalas padronizadas em pacientes isolados com MDRO. A colonização de MDRO estão associadas ao aumento do tempo de hospitalização e demonstram ter em um impacto adverso em pacientes de cuidadores paliativos assim como também em seus familiares e cuidadores. Para isso foram utilizadas as escalas Escala Hospitalar de Ansiedade e Depressão (HADS), Inventário de Depressão de Beck ou Escala de Depressão de Beck (BDI), Escala de Avaliação de Ansiedade de Hamilton (HAM-A) e Escala de Avaliação de Depressão de Hamilton (HAM-D). Isso decorre da necessidade da estratégia de prevenção para reduzir a transmissão de MDRO dentro das instalações de cuidado de saúde. Método: trata se de um estudo transversal analítico quantitativo realizado no Hospital Universitário Cajuru (HUC). Entre março de 2018 a outubro de 2018 com pacientes admitidos no setor de isolamento de contato devido á colonização por MDRO. Os MDROs incluídos no estudo foram Staphylococcus Aureus Resistente à Meticilina (MRSA), a Enterococo resistente à vancomicina (VRE), Enterobacteriaceae resistentes a carbapenem (CRE), complexo de Carbapenem-resistant Acinetobacter baumannii (CRAB) e pseudomonas aeruginosa resistente a carbapenem (CRPA) Resultados: detectamos alto índice de adoecimento por ansiedade e depressão que incluem dificuldades em virtude de infecções diminuindo as defesas do paciente com respostas imune deficientes.

Conclusão as bactérias gram-negativas multirresistentes e os conflitos intrapsíquicos dos pacientes resultam em sintomas subsindrômicos com comprometimento funcional significativo para o indivíduo causando danos físico e psicológico representando assim, um desafio em virtude de infecções, pelas poucas opções terapêuticas disponíveis e medidas eficazes para a redução de casos de infecções - colonizações.

Palavras-chave: resistência a múltiplas drogas, ansiedade, depressão, efeitos do isolamento, contato por bactérias multirresistentes.

ABSTRACT

GRANZOTTO, E. M. de O. Effects of insulation contact by multiresistant bacteria on patients' levels of anxiety and depression. Thesis - Pontifical Catholic University of Paraná - Medical School - Post-Graduation in Health Sciences Curitiba, 2019.

Introduction: Precautions for contact in patients with multidrug resistant organisms (MDRO) have been associated with adverse effects to patients, including anxiety and depression.

Objective: The aim of the present study was to evaluate the presence and level of anxiety and depression through different standardized scales in patients with MDRO. MDRO colonization is associated with increased hospitalization time and has an adverse impact on patients and caregivers, as well as their relatives. So, the following scales were used: Hospital Anxiety and Depression Scale (HADS), Beck Depression Inventory or Beck Depression Scale (BDI), Hamilton Anxiety Rating Scale (HAM-A) and Evaluation Scale of Hamilton Depression (HAM-D). It is necessary to devise a prevention strategy to reduce transmission of MDROs within health care facilities.

Method: This is a quantitative cross-sectional study conducted at Cajuru University Hospital (HUC), among March 2018 and October 2018, with patients admitted to the contact isolation sector due to colonization by MDRO. The MDROs included in the study were methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus* (VRE), carbapenem-resistant *Enterobacteriaceae* (CRE), Carbapenem-resistant *Acinetobacter baumannii* complex (CRAB) and carbapenem-resistant *Pseudomonas aeruginosa* (CRPA).

Conclusion: The multiresistant gram-negative bacteria and the intrapsychic conflicts of the patients result in subsyndromic symptoms, with significant functional impairment for the individual, causing physical and psychological damages, thus representing a challenge due to infections; the few therapeutic options available; and lack of effective measures to reduce cases of infections – colonizations.

Keywords: resistance to multiple drugs, anxiety, depression, effects of isolation, contact by multiresistant bacteria.

LISTA DE TABELAS

(Tabela Tese)

Tabela 1.	Principais estudos que avaliaram os efeitos psicológicos do isolamento de contato dentro dos hospitais.	17
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(Tabelas do Artigo)

Table 1.	Main studies evaluating the psychological effects of contact isolation because of multidrug-resistant organisms (MDROs).....	33
Table 2.	Clinical variables to evaluate the psychological effects in patients in contact isolation because of multidrug-resistant organisms (MDROs) and the control group (non-MDRO). ICU= intensive care unit; AMI = acute myocardial infarction; CHF= congestive heart failure	34
Table 3.	Depression and anxiety scores in patients in contact isolation because of multidrug-resistant organisms (MDROs) and the control group (non-MDRO)	35
Table 4.	Multivariable analysis showing the weight of each question for the proposed score to evaluate anxiety in patients in contact isolation.	36

LISTA DE FIGURA

(Figura do Artigo)

- Figure 1. Receiver operating characteristic curve of simplified anxiety score based on a cross-sectional study of 141 patients, 68 in contact isolation because of multidrug-resistant microorganisms and 73 controls.37

LISTA DE ABREVIATURAS E SIGLAS

AMI	Acute myocardial infarction
APIC	Association for Professionals in Infection Control and Epidemiology
BDI	Inventário de Depressão de Beck ou Escala de Depressão de Beck
CHF	Congestive heart failure
CRE	Carbapenem resistant Enterobacteriaceae
ESBLE	Extended-spectrum b-lactamase producing Enterobacteriaceae
GDS	Escala de Depressão Geriátrica
HADS	Escala Hospitalar de Ansiedade e Depressão
HAM-A	Escala de Avaliação de Ansiedade de Hamilton
HAM-D	Escala de Avaliação de Depressão de Hamilton
HUC	Hospital Universitário Cajuru
ICU	Intensive care unit
MDRO	Multidrug-resistant organisms
MRSA	Staphylococcus aureus resistente a meticilina
OMS	Organização Mundial da Saúde
PDMS	Perfil dos Estados do Humor
PTSD	Pós-traumático e sintomas depressivos
PUCPR	Pontifícia Universidade Católica do Paraná
ROC	Receiver operating characteristic
SARS	Severe acute respiratory syndrome
SD	Standard deviation
TETP	Transtorno de estresse pós-traumático
UFOPA	Universidade Federal do Oeste do Pará
UFPR	Universidade Federal do Paraná
VRE	Enterococcus resistentes à vancomicina

SUMÁRIO

1. INTRODUÇÃO	13
2. OBJETIVO	19
2.1. Objetivo Geral	19
2.2. Objetivo Específicos	19
3. ARTIGO	20
4. CONCLUSÃO	38
5. REFERENCIAS DA TESE	40
ANEXOS	45
1 - Escala Hospitalar de Ansiedade e Depressão - HADS	46
2 - Inventário de Depressão de Beck - BDI	48
3 - Escala de Avaliação de Ansiedade de Hamilton - HAM-A	50
4 - Escala de Avaliação de Depressão de Hamilton - HAM-D	51
5 - Artigo Publicado na Editora Elsevier	54
6 - Modelo prático de Escala de Ansiedade	61

1. INTRODUÇÃO

As infecções causadas por microrganismos multirresistentes (*multidrug-resistant organisms* - MDRO) estão associadas com o aumento no tempo da internação, de custos e da mortalidade em pacientes hospitalizados (MORGAN, 2009). Desde 1996, o Centro de Controle e Prevenção de Doenças nos Estados Unidos (Atlanta, GA, EUA) recomendou o uso de precauções de contato para determinados MDRO, como *Staphylococcus aureus* resistente a meticilina (MRSA), *Enterococcus* resistentes à vancomicina (VRE) e certos bacilos Gram-negativos que sejam "julgados por um programa de controle de infecção que tenha um significado clínico e epidemiológico especial" (BUKKI, 2013). Desde lá, outros órgãos reguladores vêm definindo suas políticas para o controle de MDRO. Atualmente é um consenso incluir nesta lista de MDRO além de MRSA e VRE, os bacilos Gram-negativos resistentes aos carbapenêmicos, como *Acinetobacter*, *Pseudomonas* e *Enterobacteriaceae* (carbapenem resistant *enterobacteriaceae* - CRE). Para prevenir a transmissão destes MDRO para outros pacientes, é recomendado o uso de precauções de contato em pacientes colonizados ou infectados com esses MDRO (GARNER, 1996). As precauções de contato não incluem apenas o isolamento, mas uma série de medidas de cuidado que não seja apenas o isolamento. O isolamento de contato recomendado consiste em colocar o paciente num quarto único com banheiro exclusivo, limitando a saída do quarto apenas para realização de exames ou procedimentos. Os profissionais de saúde e os familiares só podem entrar em contato com o paciente após higienização das mãos seguidas de colocação de um avental de mangas compridas e luvas, complementando com o isolamento as medidas de precauções de contato (BOYCE, 2002). As visitas familiares podem ser restritas a poucos familiares, para evitar disseminação de bactérias para além do hospital. Além disso, pacientes em isolamento de contato, quando precisam de procedimentos cirúrgicos ou exames, ficam por último, pois após os procedimentos, o local onde o paciente esteve precisa ser submetido a uma limpeza geral. Embora essencial para a prevenção da transmissão de MDRO nas instituições de saúde, o isolamento de contato tem sido recentemente associado a efeitos adversos aos pacientes, incluindo a possibilidade de cuidados inadequados, distante do que é idealizado para os enfermos (MORGAN, 2009).

Diferente do isolamento de contato, a quarentena separa pessoas potencialmente expostas a um agente infeccioso (em risco de doença) da comunidade (SIM, 2004). Para o bem público maior, quarentena pode criar graves problemas psicológicos, emocionais e financeiros para algumas pessoas. Para ser efetiva, a quarentena exige não só que as pessoas em risco sejam isoladas, mas também que eles sigam medidas adequadas de controle de infecção no seu local de quarentena. A quarentena foi uma condição implementada em diversos locais em 2003 durante a pandemia de SARS (*severe acute respiratory syndrome*) (TWU, 2003). No ano seguinte HAWRYLUCK analisou os efeitos psicológicos desse tipo de conduta sobre as pessoas (HAWRYLUCK, 2004). Sintomas de estresse pós-traumático e depressão foram observados em 29% e 31% das 129 pessoas colocadas em quarentena pelo risco de contaminação com o coronavírus. Os sintomas foram maiores naqueles que ficaram mais tempo em quarentena. Medir os efeitos psicológicos de isolamento e quarentena requer estudos comparando sintomas de pacientes sujeitos a quarentena com aqueles que não estão em quarentena ou isolamento (HULL, 2005). Independentemente de quanto o isolamento de contato induza de estresse pós-traumático, os profissionais de saúde devem estar cientes desta condição e preparados para fornecer apropriado apoio emocional e social às pessoas sujeitas ao isolamento de contato.

A colonização de MDRO demonstrou ter um impacto psicológico adverso em pacientes de cuidados paliativos, assim como também em seus familiares e cuidadores (DATTA, 2017). Isso decorre da necessidade de estratégias de prevenção de infecção e para reduzir a transmissão de MDRO dentro das instalações de cuidados de saúde. Importante, a implementação de intervenções de prevenção de infecção, como o isolamento do paciente e precauções de contato, é discordante com os princípios de cuidados paliativos. Dados anteriores evidenciaram o sofrimento e disforia experimentada por membros da família e pacientes, respectivamente, como resultado das precauções de isolamento do MRSA (PRENTICE, 1998).

Dados mais recentes de uma pesquisa qualitativa revelaram os efeitos da colonização por MRSA e bactérias Gram-negativas multirresistentes em cuidadores de familiares colonizados (HECKEL, 2017). Entre 62 cuidadores de 52 pacientes no final da vida, um diagnóstico de colonização por uma MDRO foi associado com sentimentos de consternação e tristeza. Precauções de contato e as medidas de isolamento foram adicionalmente associadas com espanto e incerteza entre

cuidadores e mostrou complicar inclusive o processo de melhora da experiência no cuidado do paciente entre os seus familiares pelo medo.

Segundo a Organização Mundial da Saúde (OMS) a saúde mental e a saúde física são dois elementos da vida estreitamente entrelaçados e profundamente interdependentes (WHO, 2005). Avanços na neurociência e na medicina do comportamento já mostraram que, como muitas doenças físicas, as perturbações mentais e comportamentais resultam de uma complexa interação de fatores biológicos, psicológicos e sociais. O estresse prolongado afeta o sistema imunológico e suas defesas naturais contra infecções e outras doenças. (BOTEGA, 2006). O termo “estresse” denota o estado no qual há alterações na homeostase, sendo que pode ser desencadeado devido a fatores ambientais, psicológicos e biológicos (MYERS, 1999).

A depressão é um transtorno do humor que envolve, de modo geral, um tom afetivo de tristeza, um sentimento de desamparo e uma importante redução da autoestima, um sombrio estado de ânimo, podendo demonstrar perda de interesse, (anedonia) ideia inadequada e até desejo de morte, incluindo prejuízo da capacidade cognitiva e déficit das funções vegetativas. (DALGARRONDO, 2000)

A ansiedade é um sinal de alerta, indica um perigo iminente e capacita a pessoa a tomar medida de lidar com a ameaça, a mesma afeta o pensamento, a percepção e o aprendizado. Tende a produzir confusão e distorções da percepção, não apenas do tempo e do espaço, mas também das pessoas e dos significados dos acontecimentos. Essas distorções podem interferir no aprendizado ao diminuir a concentração, reduzir a memória e perturbar a capacidade de fazer relações. (KAPLAN, 2007).

As infecções e o aspecto psíquico do paciente em isolamento de contato provocam disfunções físicas e desordens emocionais aumentando o risco de transtorno de estresse pós traumático (TETP) uma condição que se desenvolve quando uma pessoa vê, ouve ou é envolvida por um estressor traumático extremo. (KAPLAN, 2007).

A definição e análise de depressão e ansiedade podem ser qualitativos ou quantitativos. Para as análises quantitativas, geralmente são empregadas escalas de depressão e ansiedade (SCHWARZBOLD, 2014). Dentre as escalas de medidas de auto avaliação sintomatológicas clínicas estão: 1) Escala Hospitalar de Ansiedade e Depressão - HADS; 2) Escala de Depressão de Beck ou Inventário de Depressão de

Beck (Beck Depression Inventory, BDI, BDI-II); 3) Escala de Avaliação de Ansiedade de Hamilton - HAM-A; 4) A Escala de Avaliação de Depressão de Hamilton - HAM-D.

O isolamento de contato tem outros efeitos colaterais além dos psicológicos sobre os pacientes (MORGAN, 2009). Eles também podem afetar o psicológico dos profissionais de saúde (KIRKLAND, 1999) e os pacientes em isolamento são menos examinados pelos médicos e enfermeiros (EVANS, 2003). Quando são examinados, o tempo de exame físico é menor do que outros paciente menos graves inclusive (SAINT, 2003), assim como eventos adversos preveníveis acontecem mais frequentemente (STELFOX, 2003). Por exemplo, alguns mencionaram que o requisito de usar avental e luvas antes do exame do paciente pode impedir a habilidade do médico para realizar exames físicos adequados ou desincentivar os profissionais de saúde a entrar em salas de pacientes (KIRKLAND, 1999 e MORGAN, 2009). Na tabela 1 estão descritos alguns estudos que avaliaram os efeitos psicológicos de depressão e ansiedade em pacientes submetidos ao isolamento de contato.

Tabela 1. Principais estudos que avaliaram os efeitos psicológicos do isolamento de contato dentro dos hospitais

Autor	Ano	País	Motivo	Tempo de isolamento para ser incluído no estudo	Análise	Resultado
Bukki	2013	Alemanha	MRSA	Sem tempo definido	Questionário - prática de gestão de (MERSA) protocolo	Impacto negativo dos protocolos sobre a qualidade de vida
Catalano	2003	EUA	MRSA	Sem tempo definido	HAM-D e HAM-A	Aumento significativo de ansiedade e depressão e agravamento da função mental
Day	2013	EUA	MDRO	Em média de 3 dias	HADS-A, HADS-D e Escalas de Humor Analógica Visual	Os pacientes internados sob precauções de contato tiveram um pouco mais sintomas de depressão
Findik	2012	Turquia	MRSA	Sem tempo definido	HADS-A e HADS-D	Correlação negativa entre os níveis de ansiedade-depressão dos pacientes hospitalizados e suas idades.
Gammon	1998	Reino Unido	MRSA	Sem tempo definido	HADS-A, HADS-D, Questionário de Doença de Saúde, Escala de Autoestima	Sentimentos negativos de ansiedade, depressão.
Guilley-Lerondeau	2017	França	MDRO	Sem tempo definido	Escala de Spielberger	Insatisfação superior e uma ansiedade significativa em pacientes com precauções de isolamento
Hull	2005	Canadá	SARS e MRSA	Sem tempo definido	Inventário de Ansiedade Traço-estado (IDATE)	A quarentena pode resultar em transtorno de estresse pós-traumático (PTSD) e sintomas depressivos
Kennedy	1997	Reino Unido	MRSA	Sem tempo definido	BDI 1, BDI 2, Medida de Dependência Funcional (FIM-10)	Sufrimento psicológico, alteração do humor e alto índice de depressão.
Mehrotra	2013	EUA	MRSA	Sem tempo definido	Qualidade de vida - gestão MRSA (questionário estruturado)	Impacto negativo sobre a qualidade de vida
Schwarzbold	2013	Brasil	MRSA	Sem tempo definido	HAM-D, BDI e HADS	Problemas neurocomportamentais com alterações de personalidade ou distúrbios de ansiedade
Tarzi	2001	Inglaterra	MRSA	Sem tempo definido	Escala de Depressão Geriátrica - Formulário Curto (GDS) e Perfil dos Estados do Humor (PDMS)	Custos emocionais significativos, sofrimento psíquico, impacto de agravamento em ansiedade e depressão.
Wassenberg	2010	Holanda	MDRO	Sem tempo definido	HADS-A e HADS-D	Nível elevado de ansiedade e depressão

Os transtornos de humor apresentam diferenças regionais significativas, não só comparando países desenvolvidos com aqueles em desenvolvimentos, mas devido características históricas e de colonização, que levam a diferentes proporções destes transtornos, mesmo em países de nível socioeconômicos semelhantes em áreas em desenvolvimento como o Brasil (SAXENA, 2004).

Com base no exposto e as evidências de que faltam estudos sobre alterações psicológicas em pacientes submetidos ao isolamento de contato no Brasil, é pertinente um estudo que objetiva determinar a prevalência sobre a progressão dos estados de humor durante todo o período de isolamento. O reconhecimento desta relação causal terá implicações práticas relevantes permitindo a prevenção de transtornos ansiosos e o estabelecimento de estratégias de tratamento.

2. OBJETIVO

2.1. Objetivo Geral

Analisar a presença e o nível de ansiedade e depressão em pacientes hospitalizados que estejam em isolamento de contato por MDRO.

2.2. Objetivo Específicos

1 - Avaliar a presença e o nível de ansiedade através de escalas padronizadas em pacientes isolados por MDRO.

2 - Comparar o resultado entre as escalas de depressão e ansiedade aplicadas nos pacientes em isolamento de contato por MDRO para determinar a que melhor se aplica neste tipo de paciente

3 - Determinar dentro das escalas as variáveis que apresentam melhor discriminação para avaliar a ansiedade e depressão, e assim, construir um novo modelo prático de avaliação para este perfil de paciente.

4 - Verificar a presença e o nível de ansiedade dos profissionais de saúde que cuidam de pacientes em isolamento de contato em relação aos profissionais que trabalham com pacientes não isolados.

3. ARTIGO

Title:

Depression and Anxiety in Hospitalized Patients on Contact Precautions for Multidrug-resistant Microorganisms

Running title:

Anxiety and isolation

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Keywords: multidrug resistance; hospital settings; middle-income country; anxiety; depression

Abstract

Background: Contact precautions for patients with multidrug-resistant organisms (MDROs)

have been associated with adverse effects, including anxiety and depression. The aim of this study is to evaluate the presence and level of anxiety and depression through different standardized scales among patients in isolation because of MDROs.

Methods: This is a cross-sectional study with hospitalized patients on contact precautions for MDROs. A questionnaire survey was conducted to analyze the presence and level of depression and anxiety in patients using standardized scales—the Hospital Anxiety and Depression Scale, Beck Depression Inventory, Hamilton Anxiety Rating Scale (HAM-A), and Hamilton Depression Rating Scale. Clinical data and psychotropic drug use were also evaluated. A multivariable analysis was performed to define independent questions for anxiety/depression scores to create a short questionnaire facilitating a practical approach to the care of hospitalized patients with MDROs. A receiver operating characteristic (ROC) curve was plotted to determine the diagnostic ability of the simplified score.

Results: A total of 141 patients were included in the study, among whom 68 were isolated because of MDRO colonization while 73 were not isolated (control group). When HAM-A anxiety tests were applied, 45 (31.9%) patients had some degree of anxiety. Patients in MDRO contact isolation had a higher level of anxiety than those who were not isolated (55.9% vs. 9.6%, $p < 0.001$). A multivariate analysis with each questionnaire was used to determine the presence or absence of anxiety/depression. The equation allowed for the construction of a score with ROC area of 0.949 and a sensitivity of 91.1%.

Conclusion: Contact isolation for MDROs is associated with increased depression and anxiety. A simple anxiety score was developed and should be validated for screening.

INTRODUCTION

Infections caused by multidrug-resistant organisms (MDROs) are associated with increased hospitalization time, costs, and mortality (1, 2). Since 1996, the United States Center for Disease Control has recommended the implementation of contact precautions for some MDROs, such as methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus* (VRE), and carbapenem-resistant *Enterobacterales* (CRE) (3).

Contact precautions are not restricted to isolation in a single room; instead, they involve a series of precautionary measures, including an exclusive bathroom and restrictions on leaving the room except for procedures or complementary exams. Health professionals and family members can only enter the room after observing hand hygiene practices, following which they must wear gowns and gloves for all interactions that may involve contact with the patient or potentially contaminated areas in his/her environment (4, 5). To prevent the spread of bacteria beyond the hospital, family visits can be restricted to a few family members. In addition, patients in contact isolation may be the last to undergo surgical procedures or exams because their presence necessitates a final cleaning of the area.

Although regulatory agencies mandate that contact isolation is essential for the prevention of MDRO transmission in health institutions, it has recently been associated with adverse effects to patients, including the possibility of inadequate care (6). Numerous studies evaluate anxiety and depression in patients on contact precautions (Table 1), and this evaluation may be qualitative or quantitative. Quantitative analyses commonly employ depression and anxiety scales, including the Hospital Anxiety and Depression Scale (HADS), Beck Depression Inventory (BDI) or

BDI-II, Hamilton Anxiety Rating Scale (HAM-A), and Hamilton Depression Rating Scale (HAM-D). At this moment, there is no study evaluating all these scales in patients on contact precautions for MDROs.

The aim of this study was, therefore, to evaluate the presence and level of anxiety and depression through different standardized scales in patients isolated by MDROs.

METHODS

Study design

This is a cross-sectional quantitative study performed at the Hospital Universitário Cajuru (HUC) in the city of Curitiba (PR), Brazil, between March and October 2018. The HUC is a reference in trauma and surgery with 210 beds, 29 of intensive care unit. This project was approved by the HUC's Research Ethics Committee.

Inclusion and exclusion criteria

Hospitalized patients of both sexes, aged between 18 and 60 years, who had been on MDRO contact precautions (previous infection or colonization) were included in the study. The inclusion criteria also required that patients be conscious to answer the questionnaire and agree to participate in the study by signing the informed consent form. The MDROs included in the study were MRSA, VRE, CRE, carbapenem resistant *Acinetobacter baumannii* complex, and carbapenem-resistant *Pseudomonas*

aeruginosa. Patients who have been in contact with one of these etiological agents (infection or colonization) are only removed from isolation after six months and with a control culture demonstrating the absence of the microorganism. Patients who were unable to provide written informed consent, who were under the age of 18, and who could not answer questions related to any comorbidity or cognitive disorder were excluded.

Anxiety and depression evaluation

For the analysis of the presence and level of depression and anxiety in patients, standardized and validated Portuguese versions of the HADS, BDI, HAM-A, and HAM-D were used (7-10).

Clinical Data

In addition to the abovementioned scales, epidemiological data such as sex, age, education level, length of hospital stay, reason for isolation (MDRO bacteria indicating isolation), psychiatric illness or previous depression, isolation, and outcome (death) were evaluated. The Charlson Comorbidity Index was calculated, and current and previous psychotropic drug use (anticonvulsivants, antipsychotics, benzodiazepines, and antidepressants) were taken into account).

Statistical analysis

Qualitative data were described as percentages, and quantitative data were described as arithmetic mean or median value according to the distribution pattern. Standard deviation (SD) and interquartile range 25% and 75% were distribution variables for mean and median, respectively. Risk factors associated with the outcome (death) were calculated according to each variable and its distribution, as determined by the Mann-Whitney, chi-square, Fisher's exact, or Student's *t*-test. A difference of 5% ($P < 0.05$) was considered statistically significant. Odds ratios with 95% confidence intervals were calculated to indicate the strength of associations. For the multivariate analysis, all variables that were statistically significant in the univariate analysis were included. This multivariable analysis was performed to define independent questions for each score of anxiety and depression with the intention of creating a short questionnaire facilitating a practical approach to the care of hospitalized patients with MDROs. The area under the receiver operating characteristic (ROC) curve was calculated to quantify the discriminative ability of the score, with a value of 0.5 denoting random predictions and a value of 1.0 denoting perfect predictions. All tests were performed with SPSS 23.

RESULTS

Seventy patients in isolation were invited to participate in the study, and 68 consented to participate. Seventy-seven patients who were not in isolation were also invited to participate, and 73 accepted. A total of 141 patients were included in the study: 103 men and 38 women. Of these, 68 were in isolation because of MDROs and 73 were not in isolation, the majority being men (73.0%). The mean age of patients with MDROs was 44.3 years and that of patients without MDROs was 43.8 years. The

mean hospitalization duration until the administration of the questionnaire was 23 days in patients with MDROs and 10 days in non-MDRO patients ($p < 0.001$) (Table 2).

The clinical characteristics demonstrated that patients with MDROs had higher mortality (17.6% vs. 1.4%, $p < 0.001$), more chronic renal failure (8.8% vs. 1.4%, $P = 0.047$) and chronic vascular disease (16.2% vs. 4.1 %, $P = 0.016$), and higher use of psychotropic drugs during hospitalization (73.5% vs. 41.1%, $P < 0.001$). Previous use of psychotropic drugs (before hospitalization) was similar between the groups.

According to the HAM-A, 45 (31.9%) patients had some degree of anxiety. The HAM-A also demonstrated that patients in MDRO contact isolation had a higher level of anxiety than patients who were not in isolation (55.9% vs. 9.6%, $p < 0.001$). Table 3 describes the scores of depression and anxiety scales comparing patients in isolation with those who were not in isolation. According to the HADS, the prevalence of anxiety was 56.7% (80 patients), with 86.8% in patients in isolation ($p < 0.001$).

According to the HAM-D, BDI, and HADS, the prevalence of depression was higher in patients in isolation than in those who were not ($p < 0.001$). Specifically, the BDI showed some degree of depression in 97.1% of the patients whereas the HADS demonstrated that 73.5% of the patients experienced some degree of depression. On the BDI, the majority of patients had moderate to severe depression (54.4%), and on the HAM-D, 57.4% of the patients presented the same profile (sum of severe and moderate).

A multivariate analysis with the HAM-A and HADS and the presence or absence of anxiety was conducted. The HAM-A was used as an independent variable, as in the case of the HADS there were few patients without depression. In the multivariate analysis, the questions that were independently related to anxiety were those concerning motor somatization, respiratory symptoms, autonomic symptoms,

and the sensation of restlessness. Table 4 depicts the equation used to define the value of each variable to put together a simplified anxiety score. When the score was applied with a cutoff of 12 points (see Table 4), the ROC curve described in Figure 1 presented an area of 0.949, with a sensitivity of 91.1%, specificity of 75.0%, positive predictive value of 63.1%, and negative predictive value of 94.7%.

A multivariate analysis with each questionnaire assessing depression (HAM-D, BDI, HADS) was performed. As according to the HAM-D and BDI scores there were few patients without depression, the presence or absence of depression on the HADS was used as an independent variable. In the multivariate analysis, no question was independently associated with depression, and it was not possible to create a simplified score model for depression.

DISCUSSION

The ramifications of contact isolation extend beyond the psychological side effects experienced by patients (6); they can also affect the psychological health of medical professionals (11). An important problem related to contact isolation is neglect, which can lead to errors or delay in diagnosis. Patients in contact isolation undergo fewer examinations by physicians and nurses than patients who are not in isolation (12). Even when they are examined, the duration is shorter than is the case with patients with less severe conditions (13), and preventable adverse events occur more frequently (14). The necessity of wearing a gown and gloves may impede the physician's ability to perform an appropriate physical exam or discourage health care professionals from entering patient rooms (6, 11).

There are significant regional differences in mood disorders. This is evident not only in the comparison of developed countries with those developing; historical and colonization characteristics have also led to different proportions of these disorders even in countries of similar socioeconomic levels (15). In our study, anxiety and depression were significantly more common in patients in isolation than in those who were not in isolation. However, the percentages varied by scale because of the different questions used. In addition, although the scales employed in this study have been validated in the Portuguese language, they were originally developed in other countries. The HADS consists of 14 items (seven to evaluate anxiety and seven to evaluate depression) used to measure the levels of anxiety and depression in patients with hospital-associated diseases and those undergoing outpatient treatment (7). Although it was developed for use in these patients, it is currently widely used in research and clinical practice to briefly assess levels of anxiety and depression in non-psychiatric populations as well (8). In our study, this scale was the best option to distinguish between patients with and without depression since it presented a better balance between patients with MDROs and those not in contact isolation. However, in the multivariate analysis, it was not possible to evaluate which questions presented an independent relevance to the diagnosis, which is why it was not possible to establish a simplified depression score.

The BDI, created by Aaron Beck, is a self-report questionnaire with 21 multiple-choice items. It is one of the most commonly used instruments to measure the severity of depressive episodes. In its current version, the questionnaire is meant for patients over 13 years of age and is composed of several items related to depressive symptoms such as hopelessness, irritability, and cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and decreased

libido (9). In our study, the BDI overestimated pacing with depression, making it inappropriate for the evaluation of patients in MDRO contact isolation.

The HAM-A was one of the first evaluation scales developed to measure the severity of anxiety symptoms and is still widely used in clinics and research environments. The scale consists of 14 items, each defined by a series of symptoms, and measures psychic anxiety (mental agitation and psychic distress) and somatic anxiety (physical complaints related to anxiety) (10). In our study, the HAM-A presented the best way of identifying anxiety among patients in MDRO contact isolation. With this scale, it was possible to create a short questionnaire, allowing for a bedside triage as a routine for early anxiety interventions. The ROC area was favorable for this simplified score, which should be internally validated and externalized to be considered a good screening method. The HAM-D was created by Max Hamilton in the 1960s for exclusive use in patients previously diagnosed with depressive-type affective disorder. Depending on the organization and its choice of items, this scale serves to identify the severity of depressive symptoms, not their existence.

The prevalence of any degree of depression in hospitalized patients ranged from 73.5-98.5%. It is perceived that these scales have high sensitivity but may not represent the reality, since the diagnosis of depression is complex and does not depend only on an objective scale. Similarly, the anxiety questionnaires probably overestimated these diagnoses. This reinforces the need for greater attention to this problem within hospitals. Contact isolation clearly proved to be an aggravating factor, culminating in a higher prevalence of anxiety and depression in patients. Contact isolation for MDROs has been questioned in several respects (16), including the fact that it has no impact on patients with ESBL- producing Enterobacterales colonization (17, 18), MRSA (19), VRE (20), or carbapenem-resistant Enterobacterales (21). Our

study serves as a basis for reinforcing yet another deleterious effect that contact isolation can have on hospitalized patients.

In a systematic review, patient satisfaction was adversely affected by isolation if patients were kept uninformed of their health care. There is an eight-fold increase in adverse events related to supportive care failures and beyond psychological effects of isolation (22). Across the world, in developing and developed countries alike, there is an increasing need for single-bed rooms (23). Specifically, in Brazil, isolation requirements must be considered a severe problem. Furthermore, contact isolation leads to decreased hand washing, increasing the risk of transmission of MDROs among patients (11).

This study has several limitations. The control group, composed of patients who were not in isolation, was different from the group in contact isolation (longer hospitalization). The questionnaire was administered by only one psychologist, which could have led to bias. Furthermore, the psychologist knew whether or not the patients were in isolation, which could have interfered with the mode of interview. The diagnosis of depression and anxiety was based not on ICD-10 codes but on the scores described. The score of anxiety developed in this study must be validated, externally and internally.

Contact isolation for MDROs is associated with increased depression and anxiety in hospitalized patients. Considering the importance of this issue, a simple score that can help in screening can be useful. While an anxiety score was developed, the same was not possible for depression. The value of contact isolation as an important measure to avoid microorganism dissemination should be re-evaluated considering all its side effects, including the psychological aspects.

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Table 1. Main studies evaluating the psychological effects of contact isolation because of multidrug-resistant organisms (MDROs)

Author	Year	Country	MDRO	Method of evaluation	Results
Bukki	2013	Germany	MRSA	Questionnaire: Management practice of protocol	Negative impact of protocols on quality of life.
Catalano	2003	USA	MRSA	HAM-D and HAM-A	Significant increase in anxiety and depression and aggravation of mental function.
Day	2013	USA	MDRO	HADS-A, HADS-D, and Visual scale of humor	Patients on contact precautions had more symptoms of depression than those who were not on contact precautions.
Findik	2012	Turkey	MRSA	HADS-A and HADS-D	Negative correlation between age and anxiety-depression levels in hospitalized patients.
Gammon	1998	England	MRSA	HADS-A, HADS-D, Health Disease Questionnaire, Self-Esteem Scale	Negative feelings of anxiety, depression.
Guilley-Lerondeau	2017	France	MDRO	Spielberger scale	Higher dissatisfaction and anxiety in patients in isolation than in those not in isolation.
Hull	2005	Canada	SARS e MRSA	State-Trait Anxiety Inventory	Quarantine can result in posttraumatic stress disorder and depressive symptoms.
Kennedy	1997	England	MRSA	BDI, BDI-II, Functional dependent measure	Psychological distress, mood swings, and high rates of depression.
Mehrotra	2013	USA	MRSA	Quality of life: MRSA management (structured questionnaire)	Negative impact on quality of life.
Schwarzbold	2013	Brazil	MRSA	HAM-D, BDI, and HADS	Neurobehavioral problems with personality changes or anxiety disorders.
Tarzi	2001	England	MRSA	Geriatric Depression Scale-Short Form and Profile of Mood States	Significant emotional costs, psychic suffering, worsening impact on anxiety and depression.
Wassenberg	2010	Netherlands	MDRO	HADS-A and HADS-D	High level of anxiety and depression.

Table 2. Clinical variables to evaluate the psychological effects in patients in contact isolation because of multidrug-resistant organisms (MDROs) and the control group (non-MDRO). ICU= intensive care unit; AMI = acute myocardial infarction; CHF= congestive heart failure

	MDRO N = 68		Non- N = 73		
Continuous Data	Mean	Median [25-75%]	Mean	Median [25-75%]	P value
Age	44.3	49.5 [30-57]	43.8	47 [35-56]	0.823
Hospitalization (days)	47.6	34.5 [20-56]	16.3	10 [6-21]	< 0.001
Time to survey (days)	23.0	20 [9-28]	10.9	7 [4-11]	< 0.001
Time from survey to discharge (days)	24.6	11.5 [2-23]	5.4	2 [0-8]	< 0.001
Variables	n	%	n	%	
Mortality	12	17.6%	1	1.4%	< 0.001
Men	46	67.6%	53	72.6%	0.296
Previous admission to ICU	46	67.6%	26	35.6%	< 0.001
Burn	1	1.5%	0	0.0%	0.482
HIV	3	4.4%	4	5.5%	0.543
Diabetes mellitus	7	10.3%	10	13.7%	0.36
Chronic renal failure	6	8.8%	1	1.4%	0.047
Previous AMI	1	1.5%	2	2.7%	0.527
CHF	1	1.5%	1	1.4%	0.734
Peripheral arterial disease	11	16.2%	3	4.1%	0.016
Previous stroke	19	27.9%	14	19.2%	0.152
Dementia	4	5.9%	2	2.7%	
Hypertension	20	29.4%	17	23.3%	0.311
Neoplasm	3	4.4%	4	5.5%	0.328
Rheumatic disease	2	2.9%	1	1.4%	0.473
Hepatic disease	6	8.8%	7	9.6%	0.554
Any comorbidity	44	64.7%	39	53.4%	0.117
Trauma	33	48.5%	30	41.1%	0.237
Elective surgery	20	29.4%	21	28.8%	0.54
Psychotropic drugs	50	7.5%	30	41.1%	< 0.001
Phenytoin	26	38.2%	10	13.7%	0.001
Haloperidol	23	33.8%	9	12.3%	0.002
Diazepam	25	36.8%	13	17.8%	0.009
Midazolam	30	44.1%	8	11.0%	< 0.001
Quetiapin	6	8.8%	2	2.7%	0.116
Risperidone	18	26.5%	6	8.2%	0.004
Gabapentin	2	2.9%	2	2.7%	0.668
Clonazepam	8	11.8%	3	4.1%	0.083
Phenobarbital	3	4.4%	3	4.1%	0.625
Valproate	8	11.8%	2	2.7%	0.038
Carbamazepine	4	5.9%	3	4.1%	0.46
Amitriptyline	6	8.8%	10	13.7%	0.26
Donepezil	1	1.5%	0	0.0%	0.482
Chlorpromazine	2	2.9%	0	0.0%	0.231
Previous psychotropic drug use	9	13.2%	10	13.7%	0.518
Phenytoin	2	2.9%	1	1.4%	0.473
Valproate	4	5.9%	2	2.7%	0.307
Carbamazepine	3	4.4%	3	4.1%	0.625
Clonazepam	1	1.5%	1	1.4%	0.734
Risperidone	2	2.9%	0	0.0%	0.231
Diazepam	1	1.5%	1	1.4%	0.734
Haloperidol	1	1.5%	0	0.0%	0.482

Table 3. Depression and anxiety scores in patients in contact isolation because of multidrug-resistant organisms (MDROs) and the control group (non-MDRO)

	N	%	Mean	Median [25-75%]	N	%	Mean	Median [25-75%]	
HAM-A score			21.3	21 [13-28]			9.7	7 [4-11]	< 0.001
Anxious	38	55.9%			7	9.6%			
Non-anxious	30	44.1%			66	90.4%			
HAM-D score			21.0	20 [17-25]			9.4	8 [5-12]	< 0.001
Very severe	26	38.2%			2	2.7%			
Severe	14	20.6%			1	1.4%			
Moderate	25	36.8%			8	11.0%			
Mild	2	2.9%			35	47.9%			
No depression	1	1.5%			27	37.0%			
BDI score			23.9	25 [20-30]			7.9	7 [4-10]	< 0.001
Severe	19	27.9%			1	1.4%			
Moderate to severe	37	54.4%			2	2.7%			
Mild to moderate	10	14.7%			12	16.4%			
No depression	2	2.9%			58	79.5%			
HADS Anxiety			11.6	12 [10-14]			6.9	6 [4-10]	< 0.001
Anxious	59	86.8%			21	28.8%			
Non-anxious	9	13.2%			52	71.2%			
HADS Depression			9.5	10 [9-11]			5.3	5 [2-8]	< 0.001
Depression	50	73.5%			10	13.7%			
No depression	18	26.5%			63	86.3%			

Table 4. Multivariable analysis showing the weight of each question for the proposed score to evaluate anxiety in patients in contact isolation

Questions	Score	B	Wald	P value	OR	CI95%
I feel so restless that I cannot stand.	HADS	6.873627	4.385	0.036	1.47	1.23-1.74
Autonomic Symptoms: Dry mouth, flushing, paleness, tendency to sweat, wet hands, restlessness, tension, headache, bristly hair, dizziness, etc.	HAM-A	3.372055	6.204	0.013	1.92	1.58-2.46
Depressed Humor: Loss of interest, lack of pleasure in hobbies, depression, early awakening, mood swings, etc.	HAM-A	9.854236	5.829	0.016	2.83	1.95-4.11
Motor Summations: Muscle pain, muscle stiffness, spastic contractions, involuntary contractions, teeth grinding, unsure voice, etc.	HAM-A	4.980684	5.248	0.022	1.73	1.43-2.09

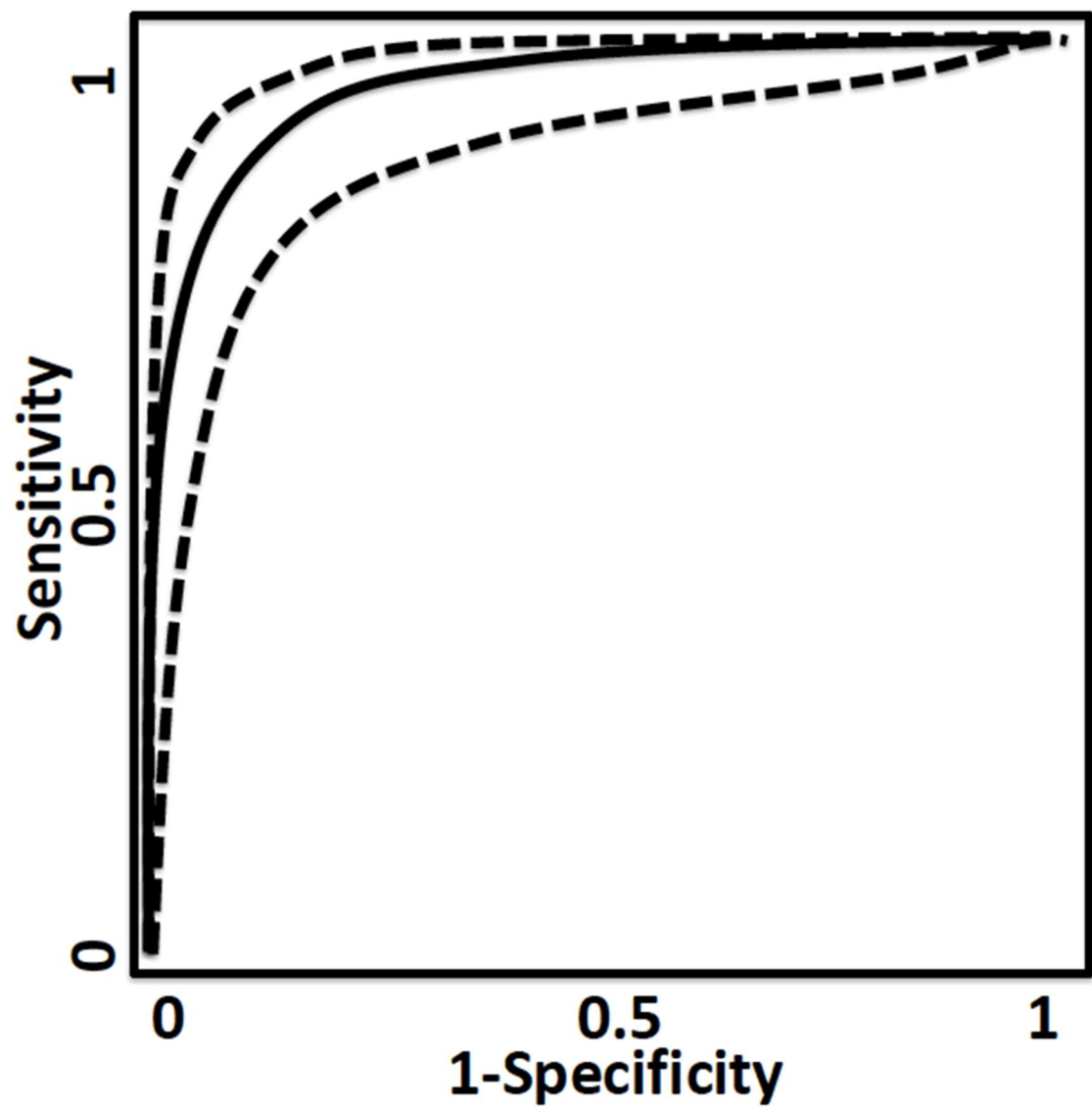


Figure 1. Receiver operating characteristic curve of simplified anxiety score based on a cross-sectional study of 141 patients, 68 in contact isolation because of multidrug-resistant microorganisms and 73 controls.

4. CONCLUSÃO

As ocorrências das bactérias resistentes, as espécies *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa* resistente a carbapenem, destacam-se como principais agentes associados às infecções criando um grande problema de saúde pública por um aumento crítico e difícil em custos hospitalares, maior tempo de internação do paciente e altas taxas de morbi-mortalidade criando assim, surto epidêmico endêmico, trazendo importante repercussão clínica desafiadora aos profissionais de saúde.

Os desafios crescentes para o controle da disseminação da resistência bacteriana associada às infecções nas instituições de saúde proporcionam um desafio e tanto em respostas aos comportamentos inseguros e às práticas que colocam a saúde de pacientes e profissionais em risco lançado pela Association for Professionals in Infection Control and Epidemiology (APIC).

Nesta perspectiva, outro desafio se impõe a labilidade emocional do paciente devido o tempo necessário na paramentação do profissional, e os transtornos comorbidos psicológicos provenientes de suas condições imunológicas.

A avaliação da ansiedade e depressão em pacientes em isolamento deve ser considerado um problema grave que afeta a adesão do paciente a sua recuperação, vários fatores ansiogênicos e sua doença clínica predominam em suas atitudes passiva como tristeza, pessimismo, fadiga, irritabilidade, inapetência, anedonia, incapacidade de imaginar ter prazer com atividades prazerosas são específicos de causas hospitalares a longo prazo que fazem parte dos critérios diagnósticos de depressão.

Segundo (FURLANETTO e CAVANAUGH, 2000), verificando, em outra pesquisa pacientes com história previa de depressão, indecisão, insônia, baixa auto-estima, desesperança ou anedonia morriam significativamente mais durante a internação, independente da gravidade física inicial.

O reconhecimento da depressão durante a internação é fundamental por estar associado a pior prognóstico.

Concluindo, a depressão pode levar a comportamentos desfavoráveis e alterações fisiológicas que precipitam doenças clínicas, quanto as doenças físicas e seus tratamentos são fatores estressantes que causam alterações fisiológicas que podem precipitar ou agravar a depressão.

As precauções de contato para MDRs estão associadas ao aumento de depressão e ansiedade em pacientes hospitalizados. O reconhecimento precoce de ansiedade e depressão desses pacientes é de extrema importância pois, seus sintomas serão susceptíveis de respostas psicológicas de níveis mais elevados de estresses e angústia interferindo negativamente psiquicamente contribuindo para efeitos colaterais e implicações angustiantes e traumáticas aos humores psicológicos do paciente.

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ANEXOS

ESCALA HOSPITALAR DE ANSIEDADE E DEPRESSÃO - HADS

Nome: _____ - Idade: _____ - Data: ____/____/____

Este questionário foi construído para ajudar a saber como se sente. Pedimos-lhe que leia cada uma das perguntas e faça uma cruz (X) no espaço anterior à resposta que melhor descreve a forma como se tem sentido na última semana.

Não demore muito tempo a pensar nas respostas. A sua reação imediata a cada questão será provavelmente mais correta do que uma resposta muito ponderada. Por favor, faça apenas uma cruz em cada pergunta.

1. Sinto-me tenso/a ou nervoso/a:

- ☐ Quase sempre
- ☐ Muitas vezes
- ☐ Por vezes
- ☐ Nunca

2. Ainda sinto prazer nas coisas de que costumava gostar:

- ☐ Tanto como antes
- ☐ Não tanto agora
- ☐ Só um pouco
- ☐ Quase nada

3. Tenho uma sensação de medo, como se algo terrível estivesse para acontecer:

- ☐ Sim e muito forte
- ☐ Sim, mas não muito forte
- ☐ Um pouco, mas não me aflige
- ☐ De modo algum

4. Sou capaz de rir e ver o lado divertido das coisas:

- ☐ Tanto como antes
- ☐ Não tanto como antes
- ☐ Muito menos agora
- ☐ Nunca

5. Tenho a cabeça cheia de preocupações:

- ☐ A maior parte do tempo
- ☐ Muitas vezes
- ☐ Por vezes
- ☐ Quase nunca

6. Sinto-me animado/a:

- ☐ Nunca
- ☐ Poucas vezes
- ☐ De vez em quando
- ☐ Quase sempre

7. Sou capaz de estar descontraidamente sentado/a e sentir-me relaxado/a:

- ☐ Quase sempre
- ☐ Muitas vezes
- ☐ Por vezes
- ☐ Nunca

8. Sinto-me mais lento/a, como se fizesse as coisas mais devagar:

- ☐ Quase sempre
- ☐ Muitas vezes
- ☐ Por vezes
- ☐ Nunca

9. Fico de tal forma apreensivo/a com medo), que até sinto um aperto no estômago:

- ☐ Nunca
- ☐ Por vezes
- ☐ Muitas vezes
- ☐ Quase sempre

10. Perdi o interesse em cuidar do meu aspecto físico:

- ☐ Completamente
- ☐ Não dou a atenção que devia
- ☐ Talvez cuide menos que antes
- ☐ Tenho o mesmo interesse de sempre

11. Sinto-me de tal forma inquieto/a que não consigo estar parado/a:

- ☐ Muito
- ☐ Bastante
- ☐ Não muito
- ☐ Nada

12. Penso com prazer nas coisas que podem acontecer no futuro:

- ☐ Tanto como antes
- ☐ Não tanto como antes
- ☐ Bastante menos agora
- ☐ Quase nunca

13. De repente, tenho sensações de pânico:

- ☐ Muitas vezes
- ☐ Bastantes vezes
- ☐ Por vezes
- ☐ Nunca

14. Sou capaz de apreciar um bom livro ou um programa de rádio ou televisão:

- ☐ Muitas vezes
- ☐ De vez em quando
- ☐ Poucas vezes
- ☐ Quase nunca

BDI - INVENTÁRIO DE DEPRESSÃO DE BECK

Nome: _____ - Idade: _____ - Data: ____/____/____

Este questionário consiste em 21 grupos de afirmações. Depois de ler cuidadosamente cada grupo, faça um círculo em torno do número (0, 1, 2 ou 3) próximo à afirmação, em cada grupo, que descreve melhor a maneira que você tem se sentido na última semana, incluindo hoje. Se várias afirmações num grupo parecerem se aplicar igualmente bem, faça um círculo em cada uma. Tome cuidado de ler todas as afirmações, em cada grupo, antes de fazer sua escolha.

1	0 Não me sinto triste 1 Eu me sinto triste 2 Estou sempre triste e não consigo sair disto 3 Estou tão triste ou infeliz que não consigo suportar	7	0 Não me sinto decepcionado comigo mesmo 1 Estou decepcionado comigo mesmo 2 Estou enojado de mim 3 Eu me odeio
2	0 Não estou especialmente desanimado quanto ao futuro 1 Eu me sinto desanimado quanto ao futuro 2 Acho que nada tenho a esperar 3 Acho o futuro sem esperanças e tenho a impressão de que as coisas não podem melhorar	8	0 Não me sinto de qualquer modo pior que os outros 1 Sou crítico em relação a mim por minhas fraquezas ou erros 2 Eu me culpo sempre por minhas falhas 3 Eu me culpo por tudo de mal que acontece
3	0 Não me sinto um fracasso 1 Acho que fracassei mais do que uma pessoa comum 2 Quando olho pra trás, na minha vida, tudo o que posso ver é um monte de fracassos 3 Acho que, como pessoa, sou um completo fracasso	9	0 Não tenho quaisquer idéias de me matar 1 Tenho idéias de me matar, mas não as executaria 2 Gostaria de me matar 3 Eu me mataria se tivesse oportunidade
4	0 Tenho tanto prazer em tudo como antes 1 Não sinto mais prazer nas coisas como antes 2 Não encontro um prazer real em mais nada 3 Estou insatisfeito ou aborrecido com tudo	10	0 Não choro mais que o habitual 1 Choro mais agora do que costumava 2 Agora, choro o tempo todo 3 Costumava ser capaz de chorar, mas agora não consigo, mesmo que o queria
5	0 Não me sinto especialmente culpado 1 Eu me sinto culpado grande parte do tempo 2 Eu me sinto culpado na maior parte do tempo 3 Eu me sinto sempre culpado	11	0 Não sou mais irritado agora do que já fui 1 Fico aborrecido ou irritado mais facilmente do que costumava 2 Agora, eu me sinto irritado o tempo todo 3 Não me irrita mais com coisas que costumavam me irritar
6	0 Não acho que esteja sendo punido 1 Acho que posso ser punido 2 Creio que vou ser punido 3 Acho que estou sendo punido	12	0 Não perdi o interesse pelas outras pessoas 1 Estou menos interessado pelas outras pessoas do que costumava estar 2 Perdi a maior parte do meu interesse pelas outras pessoas 3 Perdi todo o interesse pelas outras pessoas

13	0 Tomo decisões tão bem quanto antes 1 Adio as tomadas de decisões mais do que costumava 2 Tenho mais dificuldades de tomar decisões do que antes 3 Absolutamente não consigo mais tomar decisões	18	0 O meu apetite não está pior do que o habitual 1 Meu apetite não é tão bom como costumava ser 2 Meu apetite é muito pior agora 3 Absolutamente não tenho mais apetite
14	0 Não acho que de qualquer modo pareço pior do que antes 1 Estou preocupado em estar parecendo velho ou sem atrativo 2 Acho que há mudanças permanentes na minha aparência, que me fazem parecer sem atrativo 3 Acredito que pareço feio	19	0 Não tenho perdido muito peso se é que perdi algum recentemente 1 Perdi mais do que 2 quilos e meio 2 Perdi mais do que 5 quilos 3 Perdi mais do que 7 quilos Estou tentando perder peso de propósito, comendo menos: Sim _____ Não _____
15	0 Posso trabalhar tão bem quanto antes 1 É preciso algum esforço extra para fazer alguma coisa 2 Tenho que me esforçar muito para fazer alguma coisa 3 Não consigo mais fazer qualquer trabalho	20	0 Não estou mais preocupado com a minha saúde do que o habitual 1 Estou preocupado com problemas físicos, tais como dores, indisposição do estômago ou constipação 2 Estou muito preocupado com problemas físicos e é difícil pensar em outra coisa 3 Estou tão preocupado com meus problemas físicos que não consigo pensar em qualquer outra coisa
16	0 Consigo dormir tão bem como o habitual 1 Não durmo tão bem como costumava 2 Acordo 1 a 2 horas mais cedo do que habitualmente e acho difícil voltar a dormir 3 Acordo várias horas mais cedo do que costumava e não consigo voltar a dormir	21	0 Não notei qualquer mudança recente no meu interesse por sexo 1 Estou menos interessado por sexo do que costumava 2 Estou muito menos interessado por sexo agora 3 Perdi completamente o interesse por sexo
17	0 Não fico mais cansado do que o habitual 1 Fico cansado mais facilmente do que costumava 2 Fico cansado em fazer qualquer coisa 3 Estou cansado demais para fazer qualquer coisa		

ESCALA DE AVALIAÇÃO DE ANSIEDADE DE HAMILTON – HAM-A

Nome: _____ - Idade: _____ - Data: ____/____/____

Instruções: Esta lista de verificação é para auxiliar o clínico ou psiquiatra na avaliação de cada paciente de acordo com o seu grau de ansiedade e condição patológica. Preencha com o grau apropriado, na coluna correspondente ao lado de cada item, na coluna à direita.

GRAUS: Nenhum = 0; Leve = 1; Médio = 2; Forte = 3; Máximo = 4

Nº	ITEM	COMPORTAMENTO	GRAU
1	Humor Ansioso	Preocupações, previsão do pior, antecipação temerosa, irritabilidade, etc.	
2	Tensão	Sensações de tensão, fadiga, reação de sobressalto, comove-se facilmente, tremores, incapacidade para relaxar e agitação.	
3	Medos	De escuro, de estranhos, de ficar sozinho, de animais, de trânsito, de multidões, etc. (avaliar qualquer um por intensidade e frequência de exposição).	
4	Insônia	Dificuldade em adormecer, sono interrompido, insatisfeito e fadiga ao despertar, sonhos penosos, pesadelos, terrores noturnos, etc.	
5	Intelectual (cognitivo)	Dificuldade de concentração, falhas de memória, etc.	
6	Humor Deprimido	Perda de interesse, falta de prazer nos passatempos, depressão, despertar precoce, oscilação do humor, etc.	
7	Somatizações Motoras	Dores musculares, rigidez muscular, contrações espásticas, contrações involuntárias, ranger de dentes, voz insegura, etc.	
8	Somatizações Sensoriais	Ondas de frio ou calor, sensações de fraqueza, visão turva, sensação de picadas, formigamento, câimbras, dormências, sensações auditivas de tinidos, zumbidos, etc.	
9	Sintomas Cardiovasculares	Taquicardia, palpitações, dores torácicas, sensação de desmaio, sensação de extra-sístoles, latejamento dos vasos sanguíneos, vertigens, batimentos irregulares, etc.	
10	Sintomas Respiratórios	Sensações de opressão ou constricção no tórax, sensações de sufocamento ou asfixia, suspiros, dispnéia, etc.	
11	Sintomas Gastrointestinais	Deglutição difícil, aerofagia, dispepsia, dores abdominais, ardência ou azia, dor pré ou pós-prandial, sensações de plenitude ou de vazio gástrico, náuseas, vômitos, diarreia ou constipação, pirose, meteorismo, náusea, vômitos, etc.	
12	Sintomas Geniturinários	Polaciúria, urgência da micção, amenorréia, menorragia, frigidez, ereção incompleta, ejaculação precoce, impotência, diminuição da libido, etc.	
13	Sintomas Autonômicos	Boca seca, rubor, palidez, tendência a sudorese, mãos molhadas, inquietação, tensão, dor de cabeça, pêlos eriçados, tonteiras, etc.	
14	Comportamento na Entrevista	Tenso, pouco à vontade, inquieto, a andar a esmo, agitação das mãos (tremores, remexer, cacoetes) franzir a testa e face tensa, engolir seco, arrotos, dilatação pupilar, sudação, respiração suspirosa, palidez facial, pupilas dilatadas, etc.	
		ESCORE TOTAL:	

ESCALA DE AVALIAÇÃO DE DEPRESSÃO DE HAMILTON – HAM-D

Nome: _____ - Idade: _____ - Data: ____/____/____

Nº	PERGUNTA	ESCORE
1	HUMOR DEPRIMIDO 0. Ausente 1. Sentimentos relatados apenas ao ser perguntado 2. Sentimentos relatados espontaneamente, com palavras 3. Comunica os sentimentos com expressão facial, postura, voz e tendência ao choro 4. Sentimentos deduzidos da comunicação verbal e não verbal do paciente	
2	SENTIMENTOS DE CULPA 0. Ausentes 1. Auto recriminação; sente que decepcionou os outros 2. Ideias de culpa ou ruminção sobre erros passados ou más Ações 3. A doença atual é um castigo. Delírio de culpa 4. Ouve vozes de acusação ou denúncia e/ou tem alucinações visuais ameaçadoras	
3	SUICÍDIO 0. Ausente 1. Sente que a vida não vale a pena 2. Desejaria estar morto; pensa na possibilidade de sua morte 3. Ideias ou gestos suicidas 4. Tentativa de suicídio (qualquer tentativa séria)	
4	INSÔNIA INICIAL 0. Sem dificuldade 1. Tem alguma dificuldade ocasional, isto é, mais de meia hora 2. Queixa de dificuldade para conciliar todas as noites	
5	INSÔNIA INTERMEDIÁRIA 0. Sem dificuldade 1. Queixa-se de inquietude e perturbação durante a noite 2. Acorda à noite; qualquer saída da cama (exceto para urinar)	
6	INSÔNIA TARDIA 0. Sem dificuldade 1. Acorda de madrugada, mas volta a dormir 2. Incapaz de voltar a conciliar o sono ao deixar a cama	
7	TRABALHOS E ATIVIDADES 0. Sem dificuldade 1. Pensamento/sentimento de incapacidade, fadiga, fraqueza relacionada às atividades; trabalho ou passatempos 2. Perda de interesse por atividades (passatempos, trabalho) – quer diretamente relatada pelo paciente, ou indiretamente, por desatenção, indecisão e vacilação (sente que precisa se esforçar para o trabalho ou atividades) 3. Diminuição do tempo gasto em atividades ou queda da produtividade. No hospital, marcar 3 se o paciente passa menos de 3h em atividades externas (passatempos ou trabalho hospitalar) 4. Parou de trabalhar devido à doença atual. No hospital, marcar 4 se o paciente não se ocupar de outras atividades além de pequenas tarefas do leito, ou for incapaz de realizá-las sem auxílio	

8	RETARDO 0. Pensamento e fala normais 1. Leve retardo durante a entrevista 2. Retardo óbvio à entrevista 3. Estupor completo	
9	AGITAÇÃO 0. Nenhuma 1. Brinca com as mãos ou com os cabelos, etc 2. Troce as mãos, rói as unhas, puxa os cabelos, morde os lábios	
10	ANSIEDADE PSÍQUICA 0. Sem ansiedade 1. Tensão e irritabilidade subjetivas 2. Preocupação com trivialidades 3. Atitude apreensiva aparente no rosto ou fala 4. Medos expressos sem serem inquiridos	
11	ANSIEDADE SOMÁTICA (sintomas fisiológicos de ansiedade: boca seca, flatulência, indigestão, diarreia, cólicas, eructações; palpitações, cefaléia, hiperventilação, suspiros, sudorese, frequência urinária) 0. Ausente 1. Leve 2. Moderada 3. Grave 4. Incapacitante	
12	SINTOMAS SOMÁTICOS GASTROINTESTINAIS 0. Nenhum 1. Perda do apetite, mas alimenta-se voluntariamente; sensações de peso no abdome 2. Dificuldade de comer se não insistirem. Solicita ou exige laxativos ou medicações para os intestinos ou para sintomas digestivos	
13	SINTOMAS SOMÁTICOS EM GERAL 0. Nenhum 1. Peso nos membros, costas ou cabeça. Dores nas costas, cefaléia, mialgia. Perda de energia e cansaço 2. Qualquer sintoma bem caracterizado e nítido, marcar 2	
14	SINTOMAS GENITAIS (perda da libido, sintomas menstruais) 0. Ausentes 1. Leves distúrbios menstruais 2. Intensos	
15	HIPOCONDRIA 0. Ausente 1. Auto-observação aumentada (com relação ao corpo) 2. Preocupação com a saúde 3. Queixas frequentes, pedidos de ajuda, etc 4. Idéias delirantes hipocondríacas	
16	PERDA DE PESO (Marcar A ou B; A – pela história; B – pela avaliação semanal do psiquiatra responsável) A. 0. Sem perda de peso 1. Provável perda de peso da doença atual 2. Perda de peso definida B. 0. Menos de 0,5kg de perda por semana 1. Mais de 0,5kg de perda por semana 2. Mais de 1kg de perda por semana	

17	CONSCIÊNCIA DA DOENÇA 0. Reconhece que está deprimido e doente 1. Reconhece a doença mas atribui-lhe a causa à má alimentação, ao clima, ao excesso de trabalho, a vírus, necessidade de repouso 2. Nega estar doente	
18	VARIAÇÃO DIURNA (se há variação dos sintomas pela manhã ou à noite; caso não haja variação, marcar 0) 0. Ausentes 1. Leve 2. Grave	
19	DESPERSONALIZAÇÃO E DESREALIZAÇÃO (Idéias nülistas, sensações de irrealidade) 0. Ausentes 1. Leves 2. Moderadas 3. Graves 4. Incapacitantes	
20	SINTOMAS PARANOIDES 0. Nenhum 1. Desconfiança 2. Idéias de referência 3. Delírio de referência e perseguição	
21	SINTOMAS OBSESSIVOS E COMPULSIVOS 0. Nenhum 1. Leves 2. Graves	

ESCORE TOTAL = _____ PONTOS

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Research paper

Depression and anxiety in hospitalized patients on contact precautions for multidrug-resistant microorganisms

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KEYWORDS

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Anxiety;
Depression

Abstract Background: Contact precautions for patients with multidrug-resistant organisms (MDROs) have been associated with adverse effects. The aim of this study was, therefore, to evaluate the level of anxiety and depression through different standardized scales in patients isolated by MDROs.

Methods: This is a case–control study with hospitalized patients on contact precautions for MDROs. A questionnaire survey was conducted to analyse the presence and level of depression and anxiety. A multivariable analysis was performed to define independent questions for anxiety/depression scores to create a short questionnaire facilitating a practical approach to the care of hospitalized patients with MDROs. A receiver operating characteristic (ROC) curve was plotted to determine the diagnostic ability of the simplified score.

Results: A total of 141 patients were included in the study, among whom 68 were isolated because of MDRO colonization while 73 were not isolated (control-group). Forty-five (31.9%) patients had some degree of anxiety. Patients in MDRO contact isolation had a higher level of anxiety than those who were not isolated (55.9% vs. 9.6%, $p < 0.001$). The equation obtained by multivariate analysis allowed for the construction of a score with ROC area of 0.949 and a sensitivity of 91.1%.

Conclusion: Contact isolation for MDROs is associated with increased depression and anxiety. A simple anxiety score was developed and should be validated for screening.

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Highlights

- Infections caused by multidrug-resistant organisms are associated with increased hospitalization time, costs, and mortality.
- The implementation of contact precautions for some multidrug-resistant organisms has been recommended.
- Contact precautions have recently been associated with inadequate care, depression, and anxiety.
- Contact precautions are associated with increased depression and anxiety in hospitalized patients.

Introduction

Infections caused by multidrug-resistant organisms (MDROs) are associated with increased hospitalisation time, costs, and mortality [1,2]. Since 1996, the United States Centre for Disease Control has recommended the implementation of contact precautions for some MDROs, such as methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant *Enterococcus*, and carbapenem-resistant *Enterobacteriales* (CRE) [3]. In Parana State (Brazil), the state health department indicates isolation for at least 6 months for CRE, polymyxin or carbapenem-resistant *Pseudomonas aeruginosa* and *Acinetobacter* spp., methicillin-resistant *S. aureus*, vancomycin-resistant *Enterococcus*, and *Candida auris*.

Contact precautions are not restricted to isolation in a single room; instead, they involve a series of precautionary measures, including an exclusive bathroom and restrictions on leaving the room except for procedures or complementary exams. Health professionals and family members can only enter the room after observing hand hygiene practices, following which they must wear gowns and gloves for all interactions that may involve contact with the patient or potentially contaminated areas in his/her environment [4,5].

Although regulatory agencies mandate that contact precautions is essential for the prevention of MDRO transmission in health institutions, it has recently been associated with adverse effects to patients, including the possibility of inadequate care [6]. Numerous studies evaluate anxiety and depression in patients on contact precautions, and this evaluation may be qualitative or quantitative [7]. Quantitative analyses commonly employ depression and anxiety scales, including the Hospital Anxiety and Depression Scale (HADS), Beck Depression Inventory (BDI) or BDI-II, Hamilton Anxiety Rating Scale (HAM-A), and Hamilton Depression Rating Scale (HAM-D). Morgan et al., have published a systematic review about the adverse outcomes associated with contact precautions and Kirkland et al. revisited the issue in a narrative review [6,8]. To the authors knowledge, there is no study evaluating different scales simultaneously in patients on contact precautions for MDROs.

The aim of this study was to evaluate the level of anxiety and depression through different standardized scales in patients isolated by MDROs. A analysis was performed to define independent questions for each score of anxiety and

depression with the intention of creating a short questionnaire facilitating a practical approach to the care of hospitalised patients with MDROs.

Methods

Study design

This is a case-control quantitative study performed at the Hospital Universitario Cajuru in the city of Curitiba, Brazil, between March and October 2018 to compare the effects of isolation and contact precautions on anxiety and depression. This is a hospital specialized in trauma and surgery with 210 beds, 29 of intensive care unit.

Inclusion and exclusion criteria

The number of patients "case" (contact precaution) was included by convenience. Hospitalised patients of both sexes aged between 18 and 60 years, who had been on MDRO contact precautions (previous infection or colonization) were included in the study. The inclusion criteria also required that patients be conscious to answer the questionnaire and agree to participate in the study by signing the informed consent form. The MDROs included in the study were methicillin-resistant *S. aureus*, vancomycin-resistant *Enterococcus*, and carbapenem-resistant *Enterobacteriales*. In Parana State (Brazil), the state health department indicates isolation for at least 6 months for carbapenem-resistant *Enterobacteriales*, polymyxin or carbapenem-resistant *P. aeruginosa* and *Acinetobacter* spp., methicillin-resistant *S. aureus* and vancomycin-resistant *Enterococcus*. Patients who were unable to provide written informed consent, who were under the age of 18, and who could not answer questions related to any comorbidity or cognitive disorder were excluded. The group control were patients that were admitted in the same period of the study. Each control patient were included by randomization from a list of patients that were admitted in the same period of each case included ($\pm$ 5 days). The number of control patients was not the same of case patients because most patient does not accept to participate of the study were not available for interview in both groups. The duration of contact isolation is 6 months after the positive culture. In the end of 6 months, the cultures are repeated, and contact precautions are removed if negative.

The Division of Infection Control performs screening of MDRO using samples from rectal and nasal swab. The screening is performed in patients came from other hospitals, all patients recently admitted in the ICU and weekly after ICU admission. Patients who have been in contact with one of these etiological agents (infection or colonization) are only removed from isolation after six months and with a control culture demonstrating the absence of the microorganism (regional protocol of Parana State).

Anxiety and depression evaluation

For the analysis of the presence and level of depression and anxiety in patients, standardized and validated Portuguese versions of the HADS, BDI, HAM-A, and HAM-D were used [9–12]. All questionnaire was applied for each patient in the group case and group control. HAM-A and HAM-D are the most common scales used for diagnosis of anxiety and depression, respectively; BDI and HADS are scales used to evaluate the levels of symptoms and change over time. The BDI is a self-report questionnaire with 21 multiple-choice items to measure the severity of depressive episodes. The HADS consists of 14 items (seven to evaluate anxiety and seven to evaluate depression) used to measure the levels of anxiety and depression in patients with hospital-associated diseases. The HAM-A scale consists of 14 items to measure the severity of anxiety symptoms (psychic and somatic anxiety). The HAM-D is used to evaluate the severity of depression of patients with previous diagnosis of depression, but also have been used for identification of the severity of depressive symptoms, even in patients without a previous diagnosis of depression.

Clinical data

In addition to the abovementioned scales, epidemiological data such as sex, age, education level, length of hospital stay, reason for isolation (MDRO bacteria indicating isolation), psychiatric illness or previous depression, isolation, and outcome (death) were evaluated. Current and previous psychotropic drug use (anticonvulsants, antipsychotics, benzodiazepines, and antidepressants) was taken into account.

Statistical analysis

Nominal data were described as percentages, and quantitative data were described as arithmetic mean or median value according to the distribution pattern. Standard deviation (SD) and interquartile range 25% and 75% were distribution variables for mean and median, respectively. Risk factors associated with the outcome (death) were calculated according to each variable and its distribution, as determined by the Mann-Whitney, chi-square, Fisher's exact, or Student's *t*-test. A difference of 5% ($P < 0.05$) was considered statistically significant. Odds ratios with 95% confidence intervals were calculated to indicate the strength of associations. For the multivariate analysis, all variables that were statistically significant in the univariate analysis were included. This multivariable analysis was performed to define independent questions for each score

of anxiety and depression with the intention of creating a short questionnaire facilitating a practical approach to the care of hospitalised patients with MDROs. The area under the receiver operating characteristic (ROC) curve was calculated to quantify the discriminative ability of the score, with a value of 0.5 denoting random predictions and a value of 1.0 denoting perfect predictions. All tests were performed with SPSS 23.

Results

Seventy patients in isolation were invited to participate in the study (fulfilled inclusion criteria), and 68 consented to participate. Seventy-seven patients who were not in isolation were also invited to participate, and 73 accepted. A total of 141 patients were included in the study: 103 men and 38 women. Of these, 68 were in isolation because of MDROs and 73 were not in isolation, the majority being men (73.0%). Clinical data are summarized in Tables 1 and 2. The mean hospitalisation duration until the administration of the questionnaire was longer in patients with MDROs ($p < 0.001$) (Table 1). The clinical characteristics demonstrated that patients with MDROs had higher mortality, more chronic renal failure, chronic vascular disease, and higher use of psychotropic drugs during hospitalisation.

According to the HAM-A, 45 (31.9%) patients had some degree of anxiety. The HAM-A also demonstrated that patients in MDRO contact isolation had a higher level of anxiety than patients who were not in isolation. Table 2 describes the scores of depression and anxiety scales comparing patients in isolation with those who were not in isolation. According to the HADS, the prevalence of anxiety was 56.7% (80 patients), with 86.8% in patients in isolation ($p < 0.001$).

According to the HAM-D, BDI, and HADS, the prevalence of depression was higher in patients in isolation than in those who were not. Specifically, the BDI showed some degree of depression in 97.1% of the patients whereas the HADS demonstrated that 73.5% of the patients experienced some degree of depression. On the BDI, the majority of patients had moderate to severe depression (54.4%), and on the HAM-D, 57.4% of the patients presented the same profile (sum of severe and moderate).

A multivariate analysis with the HAM-A and HADS and the presence or absence of anxiety was conducted. The HAM-A was used as an independent variable, as in the case of the HADS there were few patients without depression. In the multivariate analysis, the questions that were independently related to anxiety were those concerning motor somatization, respiratory symptoms, autonomic symptoms, and the sensation of restlessness. Table 3 depicts the equation used to define the value of each variable to put together a simplified anxiety score. When the score was applied with a cut-off of 12 points (see Table 3), the ROC curve described in Fig. 1 presented an area of 0.949, with a sensitivity of 91.1%, specificity of 75.0%, positive predictive value of 63.1%, and negative predictive value of 94.7%.

A multivariate analysis with each questionnaire assessing depression (HAM-D, BDI, HADS) was performed. As according to the HAM-D and BDI scores there were few patients without depression, the presence or absence of depression

Table 1 Clinical variables to evaluate the psychological effects in patients in contact isolation because of multidrug-resistant organisms (MDROs) and the control group (non-MDRO).

Continuous Data	MDROs	Median [25–75%]	Non-MDRO	Median [25–75%]	P value
	N = 68 Mean		N = 73 Mean		
Age	44.3	49.5 [30–57]	43.8	47 [35–56]	0.823
Hospitalisation (days)	47.6	34.5 [20–56]	16.3	10 [6–21]	<0.001
Time to survey (days)	23.0	20 [9–28]	10.9	7 [4–11]	<0.001
Time from survey to discharge (days)	24.6	11.5 [2–23]	5.4	2 [0–8]	<0.001
Variables	n	%	n	%	
Mortality	12	17.6%	1	1.4%	<0.001
Men	46	67.6%	53	72.6%	0.296
Previous admission to ICU	46	67.6%	26	35.6%	<0.001
Burn	1	1.5%	0	0.0%	0.482
HIV	3	4.4%	4	5.5%	0.543
Diabetes mellitus	7	10.3%	10	13.7%	0.36
Chronic renal failure	6	8.8%	1	1.4%	0.047
Previous AMI	1	1.5%	2	2.7%	0.527
CHF	1	1.5%	1	1.4%	0.734
Peripheral arterial disease	11	16.2%	3	4.1%	0.016
Previous stroke	19	27.9%	14	19.2%	0.152
Dementia	4	5.9%	2	2.7%	
Hypertension	20	29.4%	17	23.3%	0.311
Neoplasm	3	4.4%	4	5.5%	0.328
Rheumatic disease	2	2.9%	1	1.4%	0.473
Hepatic disease	6	8.8%	7	9.6%	0.554
Any comorbidity	44	64.7%	39	53.4%	0.117
Trauma	33	48.5%	30	41.1%	0.237
Elective surgery	20	29.4%	21	28.8%	0.54
Psychotropic drugs	50	7.5%	30	41.1%	<0.001
Phenytoin	26	38.2%	10	13.7%	0.001
Haloperidol	23	33.8%	9	12.3%	0.002
Diazepam	25	36.8%	13	17.8%	0.009
Midazolam	30	44.1%	8	11.0%	<0.001
Quetiapine	6	8.8%	2	2.7%	0.116
Risperidone	18	26.5%	6	8.2%	0.004
Gabapentin	2	2.9%	2	2.7%	0.668
Clonazepam	8	11.8%	3	4.1%	0.083
Phenobarbital	3	4.4%	3	4.1%	0.625
Valproate	8	11.8%	2	2.7%	0.038
Carbamazepine	4	5.9%	3	4.1%	0.46
Amitriptyline	6	8.8%	10	13.7%	0.26
Donepezil	1	1.5%	0	0.0%	0.482
Chlorpromazine	2	2.9%	0	0.0%	0.231
Previous psychotropic drug use	9	13.2%	10	13.7%	0.518
Phenytoin	2	2.9%	1	1.4%	0.473
Valproate	4	5.9%	2	2.7%	0.307
Carbamazepine	3	4.4%	3	4.1%	0.625
Clonazepam	1	1.5%	1	1.4%	0.734
Risperidone	2	2.9%	0	0.0%	0.231
Diazepam	1	1.5%	1	1.4%	0.734
Haloperidol	1	1.5%	0	0.0%	0.482

Note: ICU = intensive care unit; AMI = acute myocardial infarction; CHF = congestive heart failure.

Table 2 Depression and anxiety scores in patients in contact isolation due to multidrug-resistant organisms (MDROs) and the control group (non-MDRO).

	MDRO				Non-MDRO				
	N	%	Mean	Median [25–75%]	N	%	Mean	Median [25–75%]	
HAM-A score			21.3	21 [13–28]			9.7	7 [4–11]	<0.001
Anxious	38	55.9%			7	9.6%			
Non-anxious	30	44.1%			66	90.4%			
HAM-D score			21.0	20 [17–25]			9.4	8 [5–12]	<0.001
Very severe	26	38.2%			2	2.7%			
Severe	14	20.6%			1	1.4%			
Moderate	25	36.8%			8	11.0%			
Mild	2	2.9%			35	47.9%			
No depression	1	1.5%			27	37.0%			
BDI score			23.9	25 [20–30]			7.9	7 [4–10]	<0.001
Severe	19	27.9%			1	1.4%			
Moderate to severe	37	54.4%			2	2.7%			
Mild to moderate	10	14.7%			12	16.4%			
No depression	2	2.9%			58	79.5%			
HADS Anxiety			11.6	12 [10–14]			6.9	6 [4–10]	<0.001
Anxious	59	86.8%			21	28.8%			
Non-anxious	9	13.2%			52	71.2%			
HADS Depression			9.5	10 [9–11]			5.3	5 [2–8]	<0.001
Depression	50	73.5%			10	13.7%			
No depression	18	26.5%			63	86.3%			

Note: HDAS = Hospital Anxiety and Depression Scale; BDI = Beck Depression Inventory; HAM-A = Hamilton Anxiety Rating Scale; HAM-D = Hamilton Depression Rating Scale.

on the HADS was used as an independent variable. In the multivariate analysis, no question was independently associated with depression, and it was not possible to create a simplified score model for depression.

Discussion

The ramifications of contact isolation extend beyond the psychological side effects experienced by patients [6]; they can also affect the psychological health of medical professionals [8]. An important problem related to contact isolation is neglect, which can lead to errors or delay in

diagnosis. Patients in contact isolation undergo fewer examinations by physicians and nurses than patients who are not in isolation [13]. Even when they are examined, the duration is shorter than is the case with patients with less severe conditions [14], and preventable adverse events occur more frequently [15]. The necessity of wearing a gown and gloves may impede the physician's ability to perform an appropriate physical exam or discourage health care professionals from entering patient rooms [6,8].

There are significant regional differences in mood disorders. This is evident not only in the comparison of developed countries with those developing; historical and colonization characteristics have also led to different

Table 3 Multivariable analysis showing the weight of each question for the proposed score to evaluate anxiety in patients in contact isolation.

Questions	Score	B	Wald	P value	OR	CI95%
I feel so restless that I cannot stand.	HADS	6.873627	4.385	0.036	1.47	1.23–1.74
Autonomic Symptoms: Dry mouth, flushing, paleness, tendency to sweat, wet hands, restlessness, tension, headache, bristly hair, dizziness, etc.	HAM-A	3.372055	6.204	0.013	1.92	1.58–2.46
Depressed Humour: Loss of interest, lack of pleasure in hobbies, depression, early awakening, mood swings, etc.	HAM-A	9.854236	5.829	0.016	2.83	1.95–4.11
Motor Summations: Muscle pain, muscle stiffness, spastic contractions, involuntary contractions, teeth grinding, unsure voice, etc.	HAM-A	4.980684	5.248	0.022	1.73	1.43–2.09

Note: HDAS = Hospital Anxiety and Depression Scale; HAM-A = Hamilton Anxiety Rating Scale.

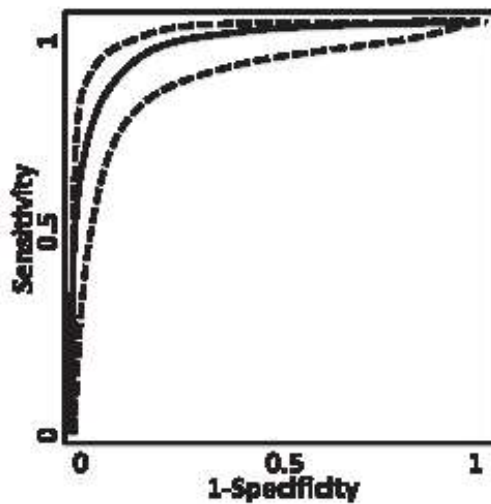


Figure 1 Receiver operating characteristic curve of simplified anxiety score based on a case-control study of 141 patients, 68 in contact isolation because of multidrug-resistant microorganisms and 73 controls.

proportions of these disorders even in countries of similar socioeconomic levels [16]. In our study, anxiety and depression were significantly more common in patients in isolation than in those who were not in isolation. However, the percentages varied by scale because of the different questions used. In addition, although the scales employed in this study have been validated in the Portuguese language, they were originally developed in other countries. The HADS is used to measure the levels of anxiety and depression in patients with hospital-associated diseases and those undergoing outpatient treatment [9]. Although it was developed for use in these patients, it is currently widely used in research and clinical practice to briefly assess levels of anxiety and depression in non-psychiatric populations as well [10]. In our study, this scale was the best option to distinguish between patients with and without depression since it presented a better balance between patients with MDROs and those not in contact isolation. However, in the multivariate analysis, it was not possible to evaluate which questions presented an independent relevance to the diagnosis, which is why it was not possible to establish a simplified depression score.

The BDI, created by Aaron Beck, is a self-report questionnaire used to measure the severity of depressive episodes. In its current version, the questionnaire is meant for patients over 13 years of age and is composed of several items related to depressive symptoms such as hopelessness, irritability, and cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and decreased libido [11]. In our study, the BDI overestimated patients with depression, making it inappropriate for the evaluation of patients in MDRO contact isolation.

The HAM-A was one of the first evaluation scales developed to measure the severity of anxiety symptoms and is still widely used in clinics and research environments [12]. In our study, the HAM-A presented the best way of identifying anxiety among patients in MDRO contact precautions. With this scale, it was possible to create a short questionnaire, allowing for a bedside triage as a routine for early anxiety interventions. The ROC area was favourable for this simplified score, which should be internally validated and externalized to be considered a good screening method. The HAM-D was created by Max Hamilton in the 1960s for exclusive use in patients previously diagnosed with depressive-type affective disorder. Depending on the organization and its choice of items, this scale serves to identify the severity of depressive symptoms, not their existence.

The prevalence of any degree of depression in hospitalised patients ranged from 73.5 to 98.5% in our study. It is perceived that these scales have high sensitivity but may not represent the reality, since the diagnosis of depression is complex and does not depend only on an objective scale [7]. Similarly, the anxiety questionnaires probably overestimated these diagnoses, as previously described [17,18]. This reinforces the need for greater attention to this problem within hospitals. Contact precautions clearly proved to be an aggravating factor, culminating in a higher prevalence of anxiety and depression in patients. Contact precautions for MDROs has been questioned in several respects [19], including the fact that it has no impact on patients with ESBL-producing *Enterobacteriales* colonization [20,21], methicillin-resistant *S. aureus* [22], vancomycin-resistant *Enterococcus* [23], or carbapenem-resistant *Enterobacteriales* [24]. Our study serves as a basis for reinforcing yet another deleterious effect that contact precautions can have on hospitalised patients.

This study has several limitations. The control group, composed of patients who were not in isolation, was different from the group in contact precautions (longer hospitalisation). The questionnaire was administered by only one psychologist, which could have led to bias. Furthermore, the psychologist knew whether or not the patients were in isolation, which could have interfered with the mode of interview. The diagnosis of depression and anxiety was based not on ICD-10 codes but on the scores described. The score of anxiety developed in this study must be validated, externally and internally. The patients used in this study were predominantly male, and this could impact in overall results. The male predominance occurred because this hospital is reference or trauma.

The early recognition of depression/anxiety of these patients are important. The use of a short questionnaire in the routine round of nurses can signalize patients with high risk for this psychological condition. Patient education may be an important step to mitigate the adverse psychological effects of isolation and is recommended the approach by psychologist or other healthcare professional with expertise in the area. However, the use of contact precautions should not be restricted by the belief that contact precautions will produce more depression or anxiety [7].

Contact precautions for MDROs is associated with increased depression and anxiety in hospitalised patients. Considering the importance of this issue, a simple score that can help in screening can be useful. While an anxiety

score was developed, the same was not possible for depression. The value of contact precautions as an important measure to avoid microorganism dissemination should be re-evaluated considering all its side effects, including the psychological aspects.

Ethics

The study has been approved by the appropriate ethical committees related to the institution (PUCPR) and subjects gave informed consent to the study.

Authorship statement

Eline Maria Granzotto – Writing - review & editing, Aline Maciel Gouveia - Data curation; Investigation; Juliano Gasparetto – Supervision; Validation, Felipe Francisco Tuon - Conceptualization; Formal analysis.

Conflict of interest

None of the authors have interest conflicts.

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Provenance and peer review

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ESCALA DE ANSIEDADE



Nome: _____ - N° Registro: _____ - Idade: _____

Neste questionário será avaliado o grau de ansiedade pelo momento que você esteja passando na internação. Solicito que leia cada uma das perguntas e todas as alternativas de respostas, marcando a que mais se enquadra no que está sentindo no momento.
Por favor, marque apenas uma alternativa de resposta.

- 1) De repente, tenho sensações de pânico, preocupações, previsão do pior, antecipação temerosa, irritabilidade etc.
☐ Nunca
☐ Por vezes
☐ Bastantes vezes
☐ Muitas vezes
- 2) Sensações de tensão, fadiga, reação de sobressalto, comove-se facilmente, tremores, incapacidade para relaxar e agitação.
☐ Nunca
☐ Por vezes
☐ Muitas vezes
☐ Quase sempre
- 3) Tenho uma sensação de medo de escuro, de estranhos, de ficar sozinho, de animais, de trânsito, de multidões, etc., como se algo terrível estivesse para acontecer.
☐ De modo algum
☐ Um pouco, mas não me aflige
☐ Sim, mas não muito forte
☐ Sim e muito forte
- 4) Dificuldade em adormecer, sono interrompido, insatisfeito e fadiga ao despertar, sonhos penosos, pesadelos, terrores noturnos etc.
☐ Quase sempre
☐ Muitas vezes
☐ Por vezes
☐ Nunca
- 5) Tenho a cabeça cheia de preocupações, dificuldade de concentração, falhas de memória etc.
☐ Quase nunca
☐ Por vezes
☐ Muitas vezes
☐ A maior parte do tempo
- 6) Perda de interesse, falta de prazer nos passatempos, depressão, despertar precoce, oscilação do humor, etc, sinto-me de tal forma inquieto/a que não consigo estar parado/a.
☐ Nada
☐ Não muito
☐ Bastante
☐ Muito

- 7) Sou capaz de estar descontraidamente sentado/a e sentir-me relaxado/a, dores musculares, rigidez muscular, contrações espásticas, contrações involuntárias, ranger de dentes, voz insegura etc.
- ☐ Quase sempre
 - ☐ Muitas vezes
 - ☐ Por vezes
 - ☐ Nunca
- 8) Fico de tal forma apreensivo/a com medo, que até sinto um aperto no estômago, ondas de frio ou calor, sensações de fraqueza, visão turva, boca seca, formigamento, câimbras, dormências, sensações auditivas de tinidos, zumbidos, taquicardia, palpitação, sensação de sufocamento ou asfixia etc.
- ☐ Nunca
 - ☐ Por vezes
 - ☐ Muitas vezes
 - ☐ Quase sempre
- 9) Tenso, pouco à vontade, inquieto, a andar a esmo, agitação das mãos (tremores, remexer, cacoetes) franzir a testa e face tensa, engolir seco, arrotos, dilatação pupilar, sudação, respiração suspirosa, palidez facial, pupilas dilatadas etc.
- ☐ Nada
 - ☐ Não muito
 - ☐ Bastante
 - ☐ Muito

Data: ____/____/____

MUITO OBRIGADO PELA SUA COLABORAÇÃO.