شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

Cairo University
Faculty of Veterinary Medicine
Department of Microbiology

Studies on the Microbial Population of Food Served into Hospitals and its Effective Surrounding Environment

A Thesis Presented by

Esraa Ashraf Mohammed

(BVSc Cairo University, 2014)

For M.V.Sc. degree
(Microbiology)

Under the Supervision of

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2021

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SUPERVISION SHEET

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Abstract

This study was performed to investigate the microbiological quality of some hospital meals and its effective surrounding environments. Two hundred raw food items and ready to eat meals were collected from3 kitchens dish out rooms and two cafeterias of hospitals compound at Cairo. The samples were kindly withdrawn from hospitals compound at Cairo governorate, Egypt during the period of August 2019 until February 2020. Thirty-seven hand of worker swabs and fifty samples of work surfaces were collected. The samples were taken according to international standard (ISO 18593:2004). The resultsshowed that the means log values for total viable counts were 4.62±0.28, 3.68±0.14, 2.57±0.15 and 3.25±0.17, for examined raw food samples, ready- to-eat samples, hand worker swabs and food contact surface swabs, respectively, while total coliforms count were 2.31±0.21, 1.83±0.37, 1.67±0.07 and 1.52±0.11 and total staphylococcal counts were 4.30±0.07, 2.70±0.33, 1.39 ±0.29 and 3.8±0.17, respectively. All isolated *Staphylococcus aureus* were positive for the virulence genes *hlg* and *ica*D genes, while *E. coli*isolates were positive for *iss* and *tsh* genes. The *Klebsiella* isolates were found to harbor *fim*H gene (type1) gene but only one isolate was positive for both *fim*H and *mag*A gene. *Pseudomonas spp*. isolates were positive for both *tox*A and *fli*C genes.
Key words: Food borne illness, Nosocomial infection, Hospital, Virulence genes, *E. coli, Staphylococcus aureus, Klebsiella, Pseudomonas, Serratia.*

Dedication

To

My Mother, my Father,

My mother-in-law, my father-in-law,

My Sister, Brothers,

My beloved daughter Lara
and

My Husband Dr. Ahmed Magdy

I am grateful for my parents whose constant love and support keep me motivated and confident. My accomplishments and success are because they believed in me.

I owe my deepest gratitude to Ahmed, who is my love. I am forever thankful for the unconditional love and support throughout the entire thesis process and every day.

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***Dr. Eman Fathi Abd El-latif** has been an ideal teacher, mentor, and thesis supervisor, offering advice and encouragement with a perfect blend of insight and humor. I am proud of, and grateful for, my time working with. **Dr. Eman Fathi Abd El-latif**, Assistant Professor of Milk Hygiene and Control, Faculty of Veterinary Medicine, Cairo University*

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LIST OF ABBREVIATIONS:

APC	Aerobic Plate Count
CIA	Central Intelligence Agency
CDC	Centers of Disease Control
CFU	Colony Forming Unit
CKp	Classical *K. pneumoniae*
CoNS	Coagulase Negative *Staphylococci*
E. coli	*Escherichia coli*
EPIC	The European Prospective Investigation into Cancer and Nutrition
ESKAPE	*Enterococcus faecium*, *Staphylococcus aureus, Klebsiella pneumoniae* , *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter* species
EntB	Enterobactin synthase component B
ESBL-producing	Extended Spectrum Beta Lactame
FliC	*Flagellin*
FimH	Type 1 Fimbriae
HIV	Human Immunodiffency Virus
Hlg	Hemolysin Gamma
***hlg*B**	Gamma-hemolysin B
hvKp	hyper virulent *K. pneumoniae*
***ica*D**	*intercellular adhesion protein*
IHME	Institute for Health Metrics and Evaluation
IUFoST	The International Union of Food Science and Technology
Iss	increased serum survival
ICUs	Intensive care units

K. pneumonia	*Klebsiella pneumoniae*
LPS	Lipopolysaccharides
MDR	Multi Drug Resistances
WHO	World Health Organization
***Mag*A**	Mucoviscosity-associated gene
MRSA	Methicillin-resistant Staphylococcus aureus
PCR	Polymerase Chain Reaction
PIA	Polysaccharide Intercellular Adhesion
PS/A	Capsular Polysaccharide / adhesion
P. aeruginosa	*pseudomonas aeruginosa*
RTE	Ready to Eat
S. aureus	*Staphylococcus aureus*
SD	Standard deviation
S. marcescens	*Serratia marcescens*
Tsh	Temperature sensitive hemagglutinin
***tox*A**	Exotoxin A
UTIs	Urinary Tract Infection

Chapter (1)

INTRODUCTION

1. INTRODUCTION

Unsafe food containing harmful bacteria, viruses, parasites, or chemical substances, causes more than 200 diseases – ranging from diarrhea to cancers. However**,** diarrheal diseases are the most common illnesses resulting from the consumption of contaminated food **(WHO, 2015)**.

The food-borne illness incidence is higher in low-income countries due to several causes of using of contaminated water for cleaning and food processing, defective food manufacturing procedures and improper food handling, lack of suitable food storage facilities, and following inadequate food safety practices **(WHO, 2015).**

According to World Bank announcement in 2019, the economic burden of the food borne illness on the total loss in productivity that related to food borne disease in low- and middle-income countries was estimated to cost US$ **95.2** billion per year, and the annual cost of treatment for food borne diseases was about US$ 15 billion **(Steven *et al.*, 2019 and WHO, 2020).**

Foodborne microbes can cause acute and chronic health illness with a great variability in duration, severity, and mortality **(Helen *et al*., 2019).** Food poisoning can affect anyone, but certain classes of people are more susceptibleto become sick and suffer from a more severe illness as their bodies' ability to withstand germs and illness is less with greater fatality rates depending on their immune systems. Pregnant women, adults aged 65 and older as well as children younger than 5 years one of the most susceptible categories **(IUFoST, 2015andCDC, 2018).**

Most food borne epidemics with great fatalities and economic costs that have developed around the world mainly are related to biological hazards **(Lawal *et al*., 2021; Chou *et al*., 2021).**