شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

# بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

# شبكة المعلومات الجامعية

# التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

# جامعة عين شمس

## التوثيق الإلكتروني والميكروفيلم

## 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

***MONA MAGHRABY***

# Quantitative Stool Culture of Candida in Autism Spectrum Disorder in Cairo, Egypt

Thesis

*Submitted for Partial Fulfillment of Master Degree in Clinical Pathology*

Presented By

**Ghada El Sayed Salem Radwan**

*M.B.B.Ch.*

*Banha University*

Under Supervision of

**Prof. Dr. Malaka Zakaria Amer**

*Professor of Clinical Pathology*

*Faculty of Medicine, Ain Shams University*

**Dr. Rania Mohamed Abd el Halim**

*Assistant Professor of Clinical Pathology*

*Faculty of Medicine, Ain Shams University*

**Dr. Reham Mohamed Elhussieny Abdelbasir**

*Assistant Professor of Pediatrics*

*Faculty of Medicine, Ain Shams University*

Faculty of Medicine

Ain Shams University

*2021*

بسم الله الرحمن الرحيم

# قالوا

## سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

صدق الله العظيم

سورة البقرة الآية: ٣٢

# Acknowledgment

*First and foremost, I feel always indebted to* **ALLAH**, *the Most Kind and Most Merciful.*

*I'd like to express my respectful thanks and profound gratitude to* ***Prof. Dr. Malaka Zakaria Amer,*** *Professor of Clinical Pathology, Faculty of Medicine, Ain Shams University for her keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

*I am also delighted to express my deepest gratitude and thanks to* ***Dr. Rania Mohamed Abd el Halim,*** *Assistant Professor of Clinical Pathology, Faculty of Medicine, Ain Shams University, for her kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

*I am deeply thankful to* ***Dr. Reham Mohamed Elhussieny Abdelbasir,*** *Assistant Professor of Pediatrics, Faculty of Medicine, Ain Shams University, for her great help, active participation and guidance.*

*I would like to express my hearty thanks to all my family for their support till this work was completed.*

*Last but not least my sincere thanks and appreciation to all patients participated in this study.*

***Ghada El Sayed Salem Radwan***

# List of Contents

| Title | Page No. |
|---|---|

**List of Tables** ..... i
**List of Figures** ..... ii
**List of Abbreviations** ..... iii
**Introduction** ..... 1
**Aim of the Work** ..... 3
**Review of Literature:**
Autism Spectrum disorder ..... 4
Diagnosis of Candidiasis in autistic spectrum disorder ..... 31
Role of the MicrobiOME IN ASD ..... 50
**Materials and Methods** ..... 55
**Results** ..... 61
**Discussion** ..... 73
**Summary** ..... 78
**Conclusion** ..... 80
**Recommendations** ..... 81
**References** ..... 82
**Arabic Summary** .....

# List of Tables

| Table No. | Title | Page No. |
|---|---|---|


**Table (1):** Morphological features of medically important Candida species on corn meal agar ..... 35

**Table (2):** Interpretation of Sugar assimilation test of Candida species ..... 43

**Table (3):** Characteristic color of different Candida species on HiCrome Candida ..... 60

**Table (4):** Candida distribution among patient group..... 62

**Table (5):** Type of candida spp. among positive cases in patient group ..... 63

**Table (6):** Comparison between patient and control group according candida stool count..... 64

**Table (7):** Comparison between patient and control groups regarding positive candida spp. distribution ..... 65

**Table (8):** Comparison between patients and control groups regarding type of candida species ..... 66

**Table (9):** Severity of CARS distribution among patient group..... 67

**Table (10):** Association between severity of CARS and candida distribution among patients group ..... 68

**Table (11):** Association between severity of CARS and candida stool count..... 69

**Table (12):** Showing association between severity of CARS and type of candida in patient group. ..... 71

# List of Figures

| Fig. No. | Title | Page No. |
|---|---|---|


**Figure (1):** Showing Candida on Sabouraud dextrose agar ..... 36

**Figure (2):** Showing different species of candida on CHRO Magar ..... 37

**Figure (3):** Germ tube formation by C.albicans ..... 39

**Figure (4):** Morphology chlamydospore formation ..... 40

**Figure (5):** Sugar assimilation test ..... 43

**Figure (6):** Sabouraud dextrose agar with 15 colonies of isolated Candida with count of 750 CFU/gram feces. ..... 59

**Figure (7):** Chromogenic media showing candida species: ..... 60

**Figure (8):** Pie chart sex distribution among patient group..... 61

**Figure (9):** Type of candida spp. among positive cases in patient group ..... 63

**Figure (10):** Comparison between patient and control groups regarding positive candida. ..... 65

**Figure (11):** Comparison between studied groups regarding to types of candida species..... 66

**Figure (12):** Association between severity of CARS and candida distribution among patients group. ..... 68

**Figure (13):** Bar chart Association between severity of CARS and candida stool count..... 70