

**PREVALENCE OF SMALL  
INTESTINAL BACTERIAL  
OVERGROWTH AMONG EGYPTIAN  
CHILDREN AND ITS IMPACT ON  
THE NUTRITIONAL STATUS**

*Thesis  
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## LIST OF ABBREVIATIONS

<b><i>BABT</i></b>	: Bile Acid Breath Test
<b><i>BHT</i></b>	: Breath Hydrogen Test
<b><i>C<sub>3</sub></i></b>	: Complement <sub>3</sub>
<b><i>CFU</i></b>	: Colony Forming Unit
<b><i>Cm</i></b>	: Centimeter
<b><i>ECN</i></b>	: Expert Comittee on Nutrition
<b><i>FAO</i></b>	: Food and Agricultural Organization
<b><i>FBH<sub>2</sub></i></b>	: Fasting Breath Hydrogen
<b><i>g</i></b>	: Gram
<b><i>G.I.T.</i></b>	: Gastro Intestinal Tract
<b><i>H<sub>2</sub> gas</i></b>	: Hydrogen gas
<b><i>H<sub>2</sub> receptor</i></b>	: Histamine receptor
<b><i>HFA</i></b>	: Height for Age
<b><i>H. Pylori</i></b>	: Helicobacter Pylori
<b><i>ICN</i></b>	: International Conference on Nutrition
<b><i>Ig</i></b>	: Immunoglobulin
<b><i>Kcal</i></b>	: Kilo calory
<b><i>Kg</i></b>	: Kilo gram
<b><i>LBHT</i></b>	: Lactulose Breath Hydrogen Test
<b><i>L. rhamnosus</i></b>	: Lactobacillus rhamnosus
<b><i>MAC</i></b>	: Mid Arm Circumference
<b><i>MCH</i></b>	: Meternal and Child Health
<b><i>Mci</i></b>	: Milli Curry
<b><i>Min.</i></b>	: Minute
<b><i>ML</i></b>	: Milli Liter

<b><i>MMC</i></b>	: Migrating Motor Complex
<b><i>M mol</i></b>	: Milli mol
<b><i>NCHS</i></b>	: National Center for Health Statistics
<b><i>NNS</i></b>	: National Nutrition Survey
<b><i>PABA</i></b>	: Para – Amino Benzoic Acid
<b><i>PEM</i></b>	: Protein Energy Malnutrition
<b><i>PPM</i></b>	: Part Per Million
<b><i>RDA</i></b>	: Required Daily Allowances
<b><i>RTI</i></b>	: Respiratory Tract Infections
<b><i>SCFAs</i></b>	: Short Chain Fatty Acids
<b><i>SD</i></b>	: Standard Deviation
<b><i>SeHCAT</i></b>	: Selenium Homo Cholic – Tauro Acid Test
<b><i>SIBO</i></b>	: Small Intestinal Bacterial Overgrowth
<b><i>T.B.</i></b>	: Tubercle Bacilli
<b><i>U.S.</i></b>	: United States
<b><i>WFA</i></b>	: Weight for Age
<b><i>WFH</i></b>	: Weight for Height
<b><i>WHO</i></b>	: World Health Organization
<b><i>XBT</i></b>	: Xylose Breath Test
<b><i>Yr</i></b>	: Year

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# INTRODUCTION & AIM OF THE WORK

1. The first part of the paper discusses the importance of the study of the history of the world, and the role of the historian in the present day. It is argued that the study of history is not only a means of understanding the past, but also a means of understanding the present and the future. The author states that the study of history is a means of understanding the human condition, and the role of the individual in society. The author also states that the study of history is a means of understanding the human mind, and the role of the individual in the human mind. The author concludes that the study of history is a means of understanding the human condition, the human mind, and the human future.

## INTRODUCTION

The intestinal bacterial flora co-exists in symbiosis with their host, but there are, however, certain conditions where the intestinal flora have been shown to cause clinical disorders either by the direct effect of their bacterial metabolite, or by interfering with the normal physiological processes, leading to malabsorption and to nutritional deficiencies (*Tabaqchali, 1984*).

These disorders occur when there is disruption of normal processes which prevent small intestinal bacterial overgrowth (SIBO) such as intestinal motility, mucosal antibacterial defenses and gastric acidity (*Savage, 1977*). When the numbers and types of bacteria usually found only distally multiply in the more proximal intestine; malabsorption, diarrhea and malnutrition; the major manifestations of SIBO; are produced (*Orenstein and whittington, 1984*).

Protein energy malnutrition (PEM) results in an increased risk of gastrointestinal infection. This can be attributed in part to impaired immune responses (*Chandra and Wadhwa, 1989*). The immune system is dependent on good nutritional status for its

optimal functioning. Immune function itself can provide a broad measure of nutritional deficiency (*Chandra and Sarchielli 1993*).

In PEM, there is a significant impairment of several aspects of immunity, including cell-mediated immune responses, secretory immunoglobulin A production, phagocyte function, complement system and cytokine production (*Chandra and Kumari, 1994*). Thus making malnourished children victims of the vicious circle of infection and malnutrition (*Bhaskarm, 1992*).

It was found that bacterial overgrowth of the small intestine is a common feature in immunodeficient patients regardless of the immunological abnormality (*Pignata et al., 1990*). SIBO may be due to impaired local immunity (*Smith et al., 1990*). It would be expected that persistent gut contamination can occur among cases who are malnourished after an attack of diarrhea (*Bagui et al., 1993*).

Malnutrition may be a determining factor in bacterial overgrowth. In a study conducted on Nigerian children, malnourished children with or without diarrhea were found to have a wider microbial spectrum in their intestinal aspirates as compared to well nourished children. Total bacterial counts were ranging between  $10^3$  and  $10^9$  organisms/ml, none of the aspirates were sterile. This confirms bacterial overgrowth as a feature of

malnourished children with or without diarrhea (*Omioko, and Abiodun, 1989*).

On the other hand, growth and nutrition have been documented to be adversely affected by gastrointestinal pathogens (*Solomons, 1993*). Bacterial overgrowth in the upper small intestine is postulated to cause persistent diarrhea (*Bhatnagar et al., 1992*). Although few episodes of diarrhea last longer than 14 days (persistent diarrhea), these episodes are particularly associated with growth faltering and malnutrition (*Penny et al., 1990*).

## **AIM OF THE WORK:**

The aim of this study was to evaluate the prevalence of small intestinal bacterial overgrowth among Egyptian children and to assess its impact on their nutritional status.

