Environmental Risk Factors Affecting the Prevalence and Transmission of Helicobacter Pylori Infection

By

Lilian Nabil Naoum Hanna
M.B.,B.Ch- Ain shams university,1994
M.Sc of Internal Medicine- Ain shams university, 2001

Thesis

Submitted in Partial Fulfillment of the Requirement
for the Doctor of Philosophy
in Environmental Science

Department of Medical Science
Institute of Environmental Studies & Research
Ain Shams University.

2009

To:

My Dear Mother

Prof. Dr.

Laila Attia Girgius

LIST OF CONTENTS

ACKNOLEDGMENT

First of all, thanks to **GOD** for all the countless gifts I have been offered, for blessing me this work and for giving me a precious hand so as to be able to fulfill it.

The author would like to express sincere thanks to **Prof. Dr. Moustafa Hassan Said Ragab,** Head of Department of Medical Science, Institute of Environmental Studies &Research, Ain- shams university for suggesting the point, supervising the work and fruitful discussion all through the work. I feel very grateful for his sincere guidance and critical suggestions.

I would also like to direct my deep appreciation to **Dr. Hala Ibrahim Awdalla,** Assistant professor in the Department of Medical Science, Institute of Environmental Studies &Research, Ain-Shams University for supervising the present work, revising the manuscript, invaluable assistance and continuous encouragement.

I would finally like to express my deep appreciation and obligation to my Husband and daughter for their cordial sacrifices and encouragement.

ABSTRACT

Background: *Helicobacter pylori (H. pylori)* infection varies remarkably between and within populations suggesting the role of socioeconomic- related environmental factors.

The aim of this study was to determine the prevalence of *Helicobacter pylori* among the studied population, to explore the effect of some environmental risk factors and life style on the transmission of infection, and to study the association between this bacterium and various non contagious diseases.

Method: This cross sectional study was conducted over six months. Two hundreds apparently healthy individuals from rural (Unshass) and urban (Nasr-city) areas voluntarily participated in this study. A full detailed clinical assessment in the form of questionnaire was designed for each individual to determine risk factors with specific emphasis to age, sex and residence. Seroprevalence of *H. pylori* IgG antibodies was evaluated using enzyme linked immunosorbent assay (ELISA). ECG, Liver function test, Random blood sugar and Hb level was performed to all participants.

Results: 28 % of the urban group was *H. pylori* positive versus 54% of rural group. A significant relation between *H. pylori* and poor sanitary conditions was detected; there was an association between *H. pylori* prevalence and gastric diseases, hepatic diseases and diabetes.

Conclusion: *Helicobacter pylori* infection was nearly twice in the rural group than in urban one.

List Of Abbreviations

Cag – A	: Cytotoxin Associated Gene
ECG	: Electrocardiograph
ELISA	: Enzyme linked immunosorbent assay
H. pylori	: *Helicobacter pylori*
Hb level	: Hemoglobin level
Hsp	: Heat shock proteins.
IgG	: Immunoglobulin G
IHPS	: Infantile hypertrophic pyloric stenosis
LPS	: Lipopolysaccharide
OD	: Optical density.
PAMPS	: Pathogen-associated molecular patterns.
PCR	: Polymerase chain reaction
PPI	: Proton pump inhibitors
SGOT	: Serum glutamic oxaloacetic transaminase
SGPT	: Serum glutamic pyruvic transaminase.
TLR	: Tol1-lik receptors
Vac-A	: Vacuolating Cytotoxin
WHO	: World Health Organization
OMP	Outer membrane protein :

LIST OF TABLES

Page

LIST OF TABLES (Cont.)

Page

LIST OF FIGURES

Page

LIST OF FIGURES (Cont.)

Page

INTRODUCTION

Helicobacter pylori (H. pylori) is a very common bacterium. It is present through out the world ***(Brown et al., 2002***), approximately 50 percent of industrialized countries population and 90 percent of the developing countries populations has been estimated to be infected ***(Brown, 2000)***. In rural Egyptian villages the overall prevalence of anti H. pylori immunoglobulin G (IgG) was 91.7% with different degrees of positivity: 40.8% mild, 39.2% moderate and 11.7 % severe (***Zakaria, 2004).***

Helicobacter pylori is a major cause of various gastroduodenal diseases. The infection has an association with chronic histological gastritis, peptic ulcer, gastric cancer and MALT lymphoma in the stomach.

All patients with *H. pylori* infection have histological gastritis and most of them remain asymptomatic for life, but some infected individuals shows ulceration or gastric cancer. Concerning gastric cancer, World Health Organization (WHO) concluded in 1994 that *Helicobacter pylori* is a definite carcinogen in humans on the basis of epidemiological studies ***(Sugiyama et al., 2004).***

This bacterium is also involved in the pathogenesis of several extra-gastric diseases, such as coronaritis,

gastroesophageal reflux disease, liver adenomas and carcinomas ***(Suerbaum et al., 2003***), iron deficiency anemia, skin disease and Rheumatological conditions (***Luigi and Giuseppe, 2005),*** also its association with diabetes mellitus is under study ***(Gulcelik et al., 2005).***

The cure of *Helicobacter pylori* infection prevents recurrence of peptic ulcer without persistent treatments against ulceration (***Sugiyama et al., 2004).***

The rate of acquisition of *H. pylori* infection varies remarkably between and within populations. This variation suggests that cultured background and socioeconomic- related environmental factors may play a role in its acquisition and transmission ***(Wizla-Derambure, 2001).***

There is a great controversy about the mode of transmission of *H. pylori* and the presence of other reservoirs, H. pylori is usually spread by the fecal-oral route but possibly also by the oral-oral route and the spread of contaminated secretions. Thus, in developing countries, individuals catch *H. pylori* at a very young age from other persons (children) in their environment. In developed countries, *H. pylori* is more difficult to acquire and is usually transmitted from one family member to another, possibly by the fecal-oral route, or by the oral-oral route, e.g., kissing, vomitus. On occasion, transmission occurs from person to person via contaminated endoscopes. Other gastric Helicobacter-like organisms have now been observed in a variety of animals, including rodents, primates, swine, and

ferrets, but, with the exception of primates and possibly cats, these isolates are clearly different from human isolates. Food borne transmission would not be unusual ***(Herrera, 2004)***.

The influence of adult socioeconomic status, co-habitation, gender, smoking, coffee and alcohol intake on risk of *H. pylori* infection is uncertain. ***(Moayyedi, 2002).***

It also seems that the pathogenesis of *H. pylori* infection is related to the virulence factors of the bacterium, environmental (dietary habits, hygiene, stress) and host factors (age, sex, blood type***) (Srp Arh Celok Lek, 2004).***

AIM OF WORK

The aim of this study is to determine the prevalence of *Helicobacter pylori* in the studied population, to explore the effect of some environmental risk factors and life style on the transmission of infection, and to study the association between this bacterium and various non contagious diseases.