Levels of Streptococcus Mutans in Children with Severe Early Childhood Caries and their Mothers. A Comparative Study in a group of Egyptian Children.

Thesis

Submitted in partial fulfillment of the requirements for Masters' Degree of Pediatric Dentistry and Dental Public Health.

By

SHAYMAA HELMEY FAYED

B.Sc. **Cairo University, 2004**

Department of Pediatric Dentistry and Dental Public Health
Faculty of Dentistry
Ain Shams University

2015

SUPERVISORS

Dr. Ahmed K. Omran

Associate Professor

Department of Pediatric Dentistry and Dental Public Health,
Faculty of Dentistry- Ain Shams University.

Dr. Tarif H. Sallam

Professor of Clinical Pathology

Faculty of Medicine- Ain Shams University

بسم الله الرحمن الرحيم

اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ (١) خَلَقَ الإِنسَانَ مِنْ عَلَقٍ (٢) اقْرَأْ وَرَبُّكَ الأَكْرَمُ (٣) الَّذِي عَلَّمَ بِالْقَلَمِ (٤) عَلَّمَ الإِنسَانَ مَا لَمْ يَعْلَمْ (٥)

صدق الله العظيم

آيه ١- ٥ سورة العلق

Acknowledgment

First of all, thanks to ***Allah*** who gave me the power to accomplish this research.

I'd like to express my deepest and grateful gratitude to ***Dr. Ahmed Kamal Omran****, Associate Professor of Pediatric Dentistry and Dental Public Health Department, Faculty of Dentistry, Ain Shams University,* he always found the time to support, guide and encourage me. His belief in me and guidance throughout the entire research gave me the motivation to work harder. Special heartful thanks to him for his great and endless support. It was a great honour to work under his wise supervision and I'd like to declare how much I learnt from him.

My deepest thanks and appreciations to ***Dr. Tarif H. Sallam****, Professor of Clinical Pathology Department, Faculty of Medicine, Ain Shams University,* for his valuable and endless support he has given to me. I owed him great thanks and respect. I have learned so much from him, and without his great effort in collecting, culturing samples as well as collecting data and colony count, this research wouldn't have been possible.

I would like to express my sincere gratitude to ***Dr. Lamia ElHusseiny Daifallah****, Lecturer of Operative Dentistry Department, Faculty of Oral and Dental Medicine, Cairo*

University, for her continuous support, patience and motivation. Her guidance helped me in all the time of research and writing of this thesis. She used to treat me like her sister. I owed her great thanks, respect and appreciation.

Appreciation is extended to all members of *Pediatric Dentistry Department*, *Faculty of Dentistry*, *Ain Shams University*, for their kindness, help and co-operation while doing this research.

I'd like to thank all my family for their unlimited support, understanding and encouragement specially my mother, husband, and brother.

Dedicated to

First of all I have the honour to dedicate this work to the soul of my father who was always beside me and who I wished to be here today.

My mother for her support and endless love she used to give me and for standing with me and encouraging me through all my life.

I can't forget my dear husband, he was always there for me, standing with me and giving me confidence.

My brother for supporting and believing in me.

Finally I dedicate this work to my sons Ahmed & Yousef.

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

S. mutans	Streptococcus mutans
ECC	Early Childhood Caries
SECC	Severe Early Childhood Caries
AAPD	American Academy of Pediatric Dentistry
CDC	Centers for Disease Control and prevention
LB	Lactobacilli
LC	Labial Caries
RC	Rampant Caries
NBC	Nursing Bottle Caries
NC	Nursing Caries
BBTD	Baby Bottle Tooth Decay
MDSD	Maternally Derived Streptococcus mutans Disease
STD	Socially Transmitted Disease
MSB	Mitis Salivarius sucrose Bacitracin
MSFA	Mannitol Sorbitol Fuchsin Azide
GSTB	Glucose Sucrose Tellurite Bacitracin
TYC	Tryptone, Yeast extract, Cystine

LIST OF CONTENTS

Introduction

Dental caries is a dieto-bacterial disease resulting from interactions among a susceptible host, cariogenic bacteria, and cariogenic diets **(*Palmer et al., 2010*)**. It is an infectious and transmissible disease, where S. mutans are the most associated infectious agents **(*Berkowitz, 2006*)**. Early childhood caries (ECC) is a virulent form of dental caries that can destroy the primary dentition of preschool children **(*Berkowitz, 2003)***. ECC is recognised as a serious public health problem due to its high prevalence, impact on quality of life and potential for increasing risk of caries in the permanent dentition **(*Seow, 2012; Shrutha et al., 2013)***.

Early acquisition of S. mutans is a key event in the natural history of the disease. Acquisition may occur via vertical or horizontal transmission **(*Berkowitz, 2003*)**. Earlier studies conducted by ***Berkowitz et al., 1980*** *and* ***Caufield et al., 1993*** demonstrated that infants acquire S. mutans from their mothers and only after the eruption of primary teeth, however, more recent studies conducted by ***Wan et al., 2001a***, ***Wan et al., 2001b*** *and* ***Ramos-Gomez et al., 2002*** indicated that S. mutans can colonize the mouths of predentate infants and that horizontal as well as vertical transmission does occur **(*Berkowitz, 2003*)**. Primary oral colonization by S. mutans coupled with caries-promoting feeding

behaviours results in accumulation of these organisms to levels exceeding 30% of the total cultivable plaque flora which in turn leads to rapid demineralization of tooth structure **(*Twetman, 2010)***. Thus it seemed interesting to know whether there would be a significance between levels of streptococcus mutans in children with severe early childhood caries compared to those levels in their mothers or not.

Consequently this study could help us to detect whether there was a vertical transmission of Streptococcus Mutans from a group of Egyptian mothers to their children or not. And if so, this means that mothers are victims in their children's severe early childhood caries.

Review of Literature

Dental health is a key to well-being; it becomes integral part of general health promotion. Healthy dentition plays many functions; it is important in enabling consumption of a varied diet and in preparing the food for digestion, so that if the dentition is impaired, it compromises the nutritional intake **(*Sheiham, 2006; Togoo, 2012)***.

Dental health also plays important roles in speech and in enhancing appearance .Despite a low mortality rate associated with dental diseases they result in impairment of teeth functions and hence they have a detrimental effect on the quality of life. Moreover, dental diseases cause considerable pain and anxiety and are expensive to treat **(*Moynian and Petersen, 2004*)**.

Evidences indicate an association between nutrition, diet and dental diseases **(*Moynian and Petersen, 2004)***; moreover; diet plays an important role in the obesity epidemic, as dietary habits in children have suffered major changes in the last thirty years **(*Gidding et al., 2006*)**.

Dental decay is commonly called dental ‘caries’, from the Latin word meaning rottenness **(*Rugg-Gunn, 2013*)**.

The results of archaeological surveys revealed that experience of dental caries was low until the nineteenth century, when it rose sharply in several European countries. This steady increase during the century 1850 to 1960 coincided with increasing importation of cane sugar from the Americas. In Britain, a defining moment occurred around 1900 when 'poor teeth' was the most important cause of rejection of volunteers for military service. This became a 'wake-up call' for those concerned with public health **(*Marthaler, 2004*)**.

In simple term, it can be defined as a microbial disease of the calcified tissues of the teeth, characterized by the demineralization of the inorganic portion and destruction of the organic substance of the tooth **(*Dogra et al., 2013*)**.

Dental caries is one of the most prevalent chronic childhood diseases worldwide and it is a major problem, both from a population health perspective and for the individual families who have to deal with young children who suffer from toothaches **(*McDonald et al., 2005*)**. It was stated that an estimated 90% of adults have experienced dental caries, with the disease most prevalent in the Middle East, Latin America, and South Asia ***(Petersen, 2003)***.