Factors Favoring Successful Weight reduction program Among adolescents attending sime schools of Misr El-Kadema , Cairo ,Egypt 2004 – 2005

Thesis

Submitted in Partial Fulfillment of MD Degree in Public Health

By

Dr. Ayman Khalifa El-Sayed
M.B.B.Ch.,M.Sc.in Public health
National Nutrition Institute

Under Supervision of

Dr. Zeinab Emam M. Afifi
Professor of Public Health,
Faculty of Medicine
Cairo University

Dr. Hoda A. F. Hassan
Consultant of Nutrition,
Former Director of National
Nutrition Institute

Dr. Omnya Refaat El Mahgoub
Assistant Professor of Public Health,
Faculty of Medicine
Cairo University

Dr. Samya A.R.Ahmad
Professor of Psychiatry
Faculty of Medicine
Cairo University

Faculty of Medicine
Cairo University

April, 2008

يقول الله تعالى في سورة البقرة على لسان الملائكة الكرام:

بسم الله الرحمن الرحيم

{ قالوا سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم }

صدق الله العظيم

آية رقم (٣٢) سورة البقرة

To My Family; Those Who Suffered A Lot

Abstract

The study was conducted on adolescent students in 4 schools of Misr El-Kadema educational directorate. It passed through three stages; the 1st was case finding survey (1551 students). The 2nd stage was case control study (151 excess weight cases & 151 normal weight controls). Third stage was intervention study where cases were randomized into 2 groups, an intervention group assigned to weight reduction program (WRP) with monthly follow up and a non intervention group assessed initially and at the end of 6 months. Overall prevalence of obesity was 11.6%, that for overweight was 18.6%. Cases had significant higher mean weight, waist, BMI, fat %, BMR, duration of TV watching and using computer than controls. They had significant higher monthly percapita income and consumed significant more fat and fast foods than controls. About three fourths of the intervention group had successful weight reduction while non of the nonintervention group had successful weight reduction by the end of 6 months.

(Key words: excess weight, obesity, overweight, adolescents, case finding survey, case control, risk factors, intervention, weight reduction program, barriers to change)

Acknowledgement

At the beginning thanks to ***God,*** without his great blessing I would have never accomplished my work.

I wish to express my hearty appreciation and sincere gratitude to ***Professor Dr. Zeinab Emam Mohamed Afifi ,*** Professor of Public Health & Community Medicine , Faculty of Medicine, Cairo University, for supervising this work , indispensable advice, tremendous invaluable help and support during the course of this study.

I owe special debt to ***Professor Dr. Hoda Abdel Fattah Hassan ,*** former Dean of National Nutrition Institute, for her inspiring supervision, continuous encouragement and scientific guidance. It was privilege to work under her supervision.

I am proudly grateful to ***Assistant Professor Dr. Omnya Refaat El Mahgoub ,*** Assistant Professor of Public Health & Community Medicine , Faculty of Medicine, Cairo University, for valuable guidance and useful effort throughout this work.

I would like also to thank ***Professor Dr. Samia Abdel Rahman Ahmad,*** Professor of Psychiatry, Faculty of Medicine, Cairo University for her guidance in the planning and implementing of this study.

I would like to extend my gratefulness to ***Professor Dr. Soad Moussa,*** Professor of Psychiatry , Faculty of Medicine , Cairo University for her generous scientific support

My deep appreciation to all members of **National Nutrition Institute;** especially members of the **Department of Nutritional Requirements & Growth**, for their great help, genuine support, and friendly attitude.

I'm deeply indebted to the group of nutritionists who supported me in the field work; namely: **Rasha Mostafa, Asmaa Ibrahim, Hoda Hamed, Ola Ali, and Khaled Abdullah, for them I'm truly grateful**

I would like to thank all **the directors and the staff of all the schools included in the study** for their cooperation and facilitating the practical part of the study.

Finally , I would like to express my warm feelings to **all the staff of members of Public Health Department, Faculty of Medicine, Cairo University** for their continuous encouragement.

List of Contents

Page No.

List of Tables

Page No.

Phase (I) Case finding survey

Phase (II) Case control Study

Phase (III) Intervention / Follow up study

List of figures

List of Annex

List of Abbreviations

AGAHLS	The Amsterdam Growth and Health Longitudinal Study
AgRP	Agouti-related peptide
AMDR	Acceptable Macronutrient Distribution Ranges
ANOVA	Analysis of variance
BCM	Body cell mass
BED	Binge-eating disorder
BIA	Bio-electrical impedance analysis
BMC	Bone mineral content
BMI	Body mass index
BMR	Basal metabolic rate
BP	Blood pressure
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
CHD	Coronary heart disease
CT	Computerized tomography
CVD	Cardiovascular diseases
DBP	Diastolic blood pressure
DEXA	Dual energy X-ray absorptiometry
DXA	Dual Energy X-ray Absorptiometry
ECG	Electrocardiographic
ECW	Extracellular water
FAO	Food and Agriculture Organization
FBG	Fasting blood glucose
FER	Fat Energy Ratio
FFM	Fat free mass
FM	Fat mass
GDP	The Gross domestic product
GNP	Gross national product
GOD	Glucose oxidase
HCPs	Health care professionals
HDL-C	High-density lipoprotein cholesterol
ICW	Intracellular water
IGF	Insulin like growth factor
IGFBP	Insulin like growth factor binding protein
IUGR	Intrauterine growth retardation
K	Potassium
Kcal	Kilo calorie
LBM	Lean body mass
LCD	Low calorie diet
LDLs	Low density lipoproteins

MC4R	Melanocortin-4 receptor
Mrem	Milli rem
MRI	Magnetic resonance imaging
MSH	Melanocyte-stimulating hormone
NAFL	Non alcoholic fatty liver disease
Na-K-ATPase	Sodium potassium adenosine triohosphatase
NASH	Non alcoholic steatohepatitis
NCD	Noncommunicable diseases
NHANES IV	4^{th} National Health and Nutrition Examination Survey
NIDDM	Non insulin dependent diabetes mellitus
NLSY	The National Longitudinal Survey of Youth
NPY	Neuropeptide Y
Ob gene	Obesity gene
OPPrA	Obesity Prevention for Pre-Adolescents program
OR	Odds ratio
PCOS	Polycystic ovary syndrome
PE	Physical education
PER	Protein energy ratio
PRL	Prolactin
PTH	Parathormone
PVN	Paraventricular nucleus
RCT	Randomized Clinical Trials
RDAs	Recommended Daily Allowances.
REE	Resting energy expenditure
SBP	Systolic blood pressure
SCFE	Slipped capital femoral epiphysis
SCT	Social cognitive theory
SD	Standard deviation
SES	Socioeconomic status
SFS	School food services
SPSS	Statistical package for social sciences
$t_{½}$	Half life
TBK	The measurement of whole body ^{40}K
TBW	Total body water
TC	Total cholesterol
TEE	Total energy expenditure
TRH	Thyrotropin-releasing hormone
TSH	Thyroid stimulating hormone
USDA	The United State Department of Agriculture
VCRs	Video cassette recorders
VLCDs	Very low calorie diets
VLDL	Very low density lipoproteins

WHR	The waist-to-hip ratio
WSQFF	weekly semi-quantitative food frequency
YRBS	Youth Risk Behavior Survey

Introduction

Introduction

Overweight and Obesity are the oldest metabolic disturbance since Stone Age, it was found in Egyptian mummies and Greek sculpture ***(Blumenrantz, 1999)***. *The prevalence of the two conditions have been steadily increasing.* WHO's latest projections indicate that globally in 2005, approximately 1.6 billion adults (age 15+) were overweight; and that at least 400 million adults were obese. By 2015, approximately 2.3 billion adults will be overweight and more than 700 million will be obese. At least 20 million children under the age of 5 years are overweight globally in 2005 ***(WHO, 2006)***.

Obesity has reached an epidemic proportion in several countries worldwide ***(Hebebrand, 2000)***. ***Flegal & Troiano, 2000*** estimated that 26% of the population of the United States (U.S.) are obese and that 61% are overweight. The health care budget in U.S. is about $190 billion and 6.7% of this budget is obesity related, which could result a cost of $ 12.7 billion ***(Lovern & Gardner, 2002)***. Obesity arises as the outcome of an adverse environment working on a susceptible genotype and it can only occur when energy intake remains higher than energy expenditure for an extended period of time ***(Treuth et al., 2000)***. The most important causes are:

Positive energy balance: The fundamental aetiology of the obese state is excessive caloric ingestion relative to caloric expenditure ***(Blundell & Cooling, 2000)***. The main components of energy expenditure and their approximate proportions in sedentary people are basal metabolic rate (≈65%), thermogenesis (≈10%) and physical activity (≈25%) ***(Kopelman & Stock, 1998)***. Positive energy balance is the result of:

a- Dietary factors: Since World War-II, there has been a marked shift in the macronutrient composition of the diet favoring fat at the expense of carbohydrate, while the proportion of energy derived from protein has remained essentially unchanged ***(Prentice & Jebb, 1995)***. There has been a change in the type of fat consumed, with a decrease in saturated fatty acids and increase in polyunsaturated fatty acids ***(Paulus et al., 2001)***. The under-reporting of food intake especially among obese subjects hinders studies of the links between dietary habits and obesity ***(Harrison et al., 2000)***.