NUTRITIONAL STATUS (AS DETERMINED BY ANTHROPOMETRIC DATA) OF CHILDREN AGED 6 TO 8 YEARS IN KOTA KINABALU AND RANAU

STELLA AINUN BT. ABDULLAH

THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

SCHOOL OF FOOD SCIENCE AND NUTRITION
UNIVERSITY MALAYSIA SABAH
KOTA KINABALU

2002

UNIVERSITI MALAYSIA SABAH

BORANG PENGESAHAN STATUS TESIS SARJANA

JUDUL: **NUTRITIONAL STATUS (AS DETERMINED BY ANTHROPOMETRIC DATA) CHILDREN AGED 6 TO 8 YEARS IN KOTA KINABALU AND RANAU**

Ijazah: Master of Science

SESI PENGAJIAN: 2002

Saya STELLA AINUN BT. ABDULLAH mengaku membenarkan tesis Sarjana ini disimpan di Perpustakaan Universiti Malaysia Sabah dengan syarat-syarat kegunaan seperti berikut:

1. Tesis adalah hakmilik Universiti Malaysia Sabah.
2. Perpustakaan Universiti Malaysia Sabah dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. Sila tandakan (/)

[ ]	SULIT	(Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti Yang termaktub di dalam AKTA RAHSIA RASMI 1972)
[ ]	TERHAD	(Mengandungi maklumat TERHAD yang telah di tentukan oleh organisasi/badan di mana penyelidikan dijalankan)
[/]	TIDAK TERHAD	

(STELLA AINUN BT. ABDULLAH)

Tarikh: 30hb September 2002

Disahkan oleh:

ANITA BINTI ARSAD
PUSTAKAWAN KANAN
UNIVERSITI MALAYSIA SABAH

(TANDATANGAN PUSTAKAWAN)

DR. POEDIJONO NITISEWOJO
Nama Penyelia

Tarikh: September 2002

DECLARATION

(PENGAKUAN)

Saya akui karya ini adalah hasil kerja saya sendiri kecuali nukilan dan ringkasan tiap-tiap satunya telah saya jelaskan sumbernya.

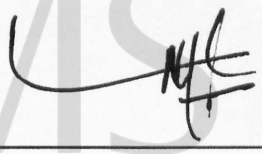
30 hb SEPTEMBER 2002

STELLA AINUN BT. ABDULLAH
PS98-009-001

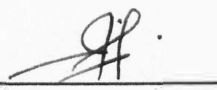
DIPERAKUKAN OLEH

Prof. Madya DR. POEDIJONO NITISEWOJO
PENYELIA

DR. TEE E SIONG
IMR
PEMERIKSA LUAR



DR. CHYE FOOK YEE
Universiti Malaysia Sabah
PEMERIKSA DALAM



Prof. Madya Dr. MOHD. ISMAIL ABDULLAH
Dekan,
Sekolah Sains Makanan dan Pemakanan,
Universiti Malaysia Sabah.

Prof. Dr. MOHD. ZAHEDI DAUD
Dekan,
Pusat Pengajian Pascasiswazah,
Universiti Malaysia Sabah.

ACKNOWLEDGEMENTS

I would like to thank my supervisor Dr. Poedijono Nitisewojo for his patience and encouragement, the Ministry of Education, Malaysia, Datin Amy-Jean Yee, Principal of Datuk Simon Fung School, the school principals, all the students and their parents for their kind permissions to conduct this study.

ABSTRAK

Kajian silang ini bertujuan untuk menilai status pemakanan kanak-kanak berumur 6 hingga 8 tahun dengan menggunakan indeks anthropometri di daerah Kota Kinabalu dan Ranau, serta berhubungkait antara status pemakanan dengan gaya hidup, tabiat makan dan sosio-ekonomi keluarga. Seramai 1,777 kanak-kanak, 804 orang kanak-kanak perempuan (232 berumur 6 tahun, 261 berumur 7 tahun dan 311 berumur 8 tahun) dan 973 orang kanak-kanak lelaki (274 berumur 6 tahun, 326 berumur 7 tahun dan 373 berumur 8 tahun) terlibat dalam kajian ini. Indeks anthropometri seperti berat untuk umur, ketinggian untuk umur dan berat untuk ketinggian antara negatif dua sisihan piawai (-2SP) dan positif dua sisihan piawai (+2SP) daripada medan NCHS adalah dikategorikan sebagai pembesaran normal, dibawah negatif dua sisihan piawai diklasifikasikan sebagai kekurangan zat dan ke atas positif dua sisihan piawai sebagai nutritsi berlebihan. Seramai 11.3% (7.5% perempuan dan 14.4% lelaki) kanak-kanak mengalami masalah terbantut ("stunting"), 9.8% (7.7% perempuan dan 11.5% lelaki) kanak-kanak mengalami kekurangan berat badan ("underweight"), dan 5.7% (5.7% perempuan dan 5.7% lelaki) kanak-kanak mengalami kesusutan ("wasting"). Prevalen berat berlebihan ("overweight") ialah 8.9% (8.1% perempuan dan 9% lelaki). Tiada berbezaan signifikan statistik antara kaum-kaum eknik dan indeks anthropometri kecuali kanak-kanak lelaki kaum cina bagi indeks ketinggian untuk umur saja. Kolerasi antara malnutritsi dengan ukur lilit pertengahan lengan atas, manakala kolerasi antara berat berlebihan dan lipatan kulit trisep adalah tepat. Terdapat berbezaan sosio-ekonomi dikalangan penduduk dari Kota Kinabalu dan Ranau berdasarkan kepada purata pendapatan. Kekerapan makan luar dan mengambil makanan jenis barat telah menjadi amalan pemakanan kanak-kanak. Kanak-kanak dari kumpulan masyarakat sosio-ekonomi yang rendah mengalami masalah malnutritsi dan pengambilan diet berkualiti rendah manakala kanak-kanak lelaki dengan berat badan berlebihan adalah dari golongan pendapatan yang lebih tinggi dengan gaya hidup sedentari. Dalam kajian ini didapati kolerasi negatif antara persepsi ibubapa terhadap saiz badan kanak-kanak mereka dengan malnutritsi dan nutritsi berlebihan.

ABSTRACT

This is a cross-sectional study to assess the nutritional status (as determined by anthropometry) of children aged 6 to 8 years in Kota Kinabalu and Ranau, and to correlate lifestyle, dietary habits and socioeconomic with the anthropometry indexes. A total of 1,777 children were involved in this study, 804 girls (232 aged 6, 261 aged 7 and 311 aged 8) and 973 boys (274 aged 6, 326 aged 7 and 373 aged 8). Weight for age, height for age and weight for height between minus two standard deviations (-2 SD) and plus two standard deviations (+2 SD) of the National Center for Health Statistics (NCHS) median were considered as having normal growth attainment, below minus 2 SD were considered malnourished and above plus 2 SD NCHS median were considered over nourished. The overall prevalence rate of stunting was 11.3% (7.5% girls and 14.4% boys), 9.8% underweight (7.7% girls and 11.5% boys), and 5.7% wasting (5.7% girls and 5.7% boys). New found overweight problem was established with an overall prevalence rate of 8.9% overweight (8.1% girls and 9% boys). No significant differences were found amongst various ethnic groups and anthropometric indexes except for Chinese boys who were different from other ethnic groups in height for age only. Proxy measurements such as MUAC were found to correlate with malnutrition, and triceps skinfold correlate with overweight. There were differences in socioeconomic status between Kota Kinabalu and Ranau based on mean income levels. Changing food consumption patterns such as eating out and taking western type of foods were evident. Malnutrition was correlated with a lower socioeconomic status, and with a lower quality diet. Overweight boys were correlated with higher socioeconomic status, and with a sedentary lifestyle. Perception of parents on the weights of these children was negatively correlated with both malnutrition and overweight children in this study.

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

LIST OF FIGURES

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

ABBREVIATIONS

α^2	:	Pearson chi-square test
<	:	Less than
>	:	More than
ANOVA	:	Analysis of variance
cm	:	Centimeter
gr	:	Group
hrs	:	Hours
IQ	:	Intelligence quotient
kg	:	Kilogram
KL	:	Kuala Lumpur
mm	:	Millimeter
MUAC	:	Mid upper arm circumference
N	:	Number
NCHS	:	National Center for Health Statistics
R	:	Pearson bivariate correlation coefficient
SD	:	Standard deviation
sm	:	Sentimeter
SP	:	Sisihan piawai
U.S.A.	:	United States of America

ABBREVIATIONS

WHO	:	World Health Organization
yrs	:	Years

TERMS OF REFERENCE

Anthropometry	:	The science of measuring the size, weight, height and proportion of the human body
Food security	:	Accessibility by all people at all times to the food needed for a healthy life
Health status	:	A measurement of physical, mental and social well-being of an individual without any disease or infirmity
Height	:	Measurement of linear growth
Height for age	:	A standard for evaluating the growth of children that gives rankings for height for specific age
Index	:	An indicator and is usually make up of more than one variable
Morbidity	:	A disease condition or state
Mortality	:	Loss of life
Nutrition	:	The science that explains the role of food and nutrients in the human body during growth, development and maintenance of life
Nutritional status	:	A measurement of the extend to which the individual physiologic needs for nutrients are being met and are expressed according to scientifically tested parameters such as weight, height, age or a combinations of these three.
Overweight	:	Excessive gain in weight and is determined by weight more than plus 2 SD NCHS median weight for height
Reference	:	Measurements from a group of healthy people used for comparison
Socioeconomic	:	Collection of people and its management of resources

TERMS OF REFERENCE

Stunting	:	Impaired gain in height and is determined by minus 2 SD NCHS height for age
Utilities	:	Something make for practical purposes such as electricity, water supplies
Variable	:	Something subject to change such as weight, height or age
Wasting	:	Impaired gain in weight and height and is determined by minus 2SD NCHS median weight for height
Weight	:	Measurement of body mass
Weight for age	:	A standard for evaluating the growth of children that gives rankings for weight for specific age
Weight for height	:	A standard for evaluating the growth of children that gives rankings for weight for specific heights with no mention to age

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 ASSESSMENT OF HEALTH

Adequate food intake in the right amounts appropriate for age, sex, level of activity and physiological status are important determinants of health. An adequate diet is necessary for an individual to stay active and healthy. Adequacy of diets is considered in quantitative terms (i.e. energy sufficiency) and qualitative terms (i.e. variety, safety and cultural acceptability). Nutrition is the science that explains the role of food and nutrients in the human body during growth, development and maintenance of life. It is concerned with how food is produced, processed, handled, sold, prepared, shared, and eaten and how the food is digested, absorbed and used by the body. Nutritional status refers to the nutritional state of the body as expressed according to scientific parameters such as weight, height, age or combinations of these (FAO, 1997). Using these parameters, an individual can be assessed as having good or poor nutritional status. In other words, nutritional status is a determinant of health. Determining health status using anthropometry (i.e. measuring weight and height) is the simplest way of measuring health (Gorstein *et al.*, 1994; WHO, 1995). Anthropometrical measurements permit the development of certain indexes reflecting individual or population characteristics, such

as wasting, stunting and overweight. Anthropometric indexes are quantitative indicators, which describe the nutritional and health status of individuals and population groups but do not explain the underlying causes of the problem. To have a better understanding of the problems such as wasting, stunting and overweight, other qualitative information are needed about many aspects of life within and around the community. Qualitative information reflects peoples' opinions and perceptions of under nutrition and over nutrition and its probable causes. Health of children is important for survival, for cognitive developments, and to lay the foundation towards a better and a more productive community in the future and a healthier adulthood. The attainment of good health by a population is important for nation building and better quality of life (Chong, 1982).

1.2 DEFINITION OF THE PROBLEM

Studies on nutritional status of children and adults in Sabah have been relatively scarce. Literature search revealed only three studies have been carried out in Sabah by Gan *et al.* (1993); Chong *et al.* (1984); and Chen *et al.* (1981). The first two mentioned studies covered preschool children whereas the last mentioned study covered children aged 0 to 12 years. Milk supplementation intervention program financed by the Sabah State government for primary school children was initiated because of the findings by Chen *et al.* (1981).

For the past 20 years rapid socioeconomic changes have taken place that have changed the nutritional status of many Malaysians. Personal observations during trips to