



UNIVERSITI PUTRA MALAYSIA

**EFFECTIVENESS OF MILK SUPPLEMENTATION
ON THE NUTRITIONAL STATUS OF UNDERNOURISHED
PRESCHOOL CHILDREN**

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**EFFECTIVENESS OF MILK SUPPLEMENTATION
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PRESCHOOL CHILDREN**

by

KOH CHU SING

**Thesis Submitted in Fulfilment of The Requirements for the
Degree of Doctor of Philosophy
in the Faculty of Biomedical and Health Sciences,
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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	ii
LIST OF TABLES.....	vii
LIST OF FIGURES.....	xvii
ABSTRACT.....	xix
ABSTRAK.....	xxii
 CHAPTER	
1 INTRODUCTION.....	1
Preamble.....	1
Nutritional Status of Preschool Children.....	2
Protein-Energy	2
Malnutrition.....	7
Anaemia.....	7
Vitamin A Deficiency.....	7
Nutrition Intervention Programmes for Children.....	9
Milk Supplementation Programme of the Ministry of Health.....	12
Justification for the Study	13
Statement of the Problem.....	14
Objectives of the Study	17
Hypothesis of the Study.....	18
Conceptual Framework.....	19
2 LITERATURE REVIEW.....	22
Introduction.....	22
Definition and Types of Supplementary Feeding Programmes.....	23
Impact of the Food Supplementation Programme.....	25
Amount of Food Supplemented.....	31
Sharing.....	33
Substitution.....	36
Participation	38
Age of Participants	40
Initial Nutritional Status of Participants.....	41
Quality and Type of Supplements.....	43
Duration of Supplementation	47
Infection and Parasitic Infestation	49
3 METHODOLOGY.....	52
Selection of Study District.....	52
Initial Orientation of Community.....	53
Research Design	53

Household Interview	57
The Questionnaire	58
Anthropometry.....	61
Weight.....	62
Height/Recumbent Length.....	62
Mid-Upper Arm Circumference.....	63
Head Circumference.....	64
Skinfold Thickness.....	64
Examination of Stool for Intestinal Parasites.....	65
Haematology and Biochemistry.....	67
Collection of Blood Samples.....	67
Haemoglobin Concentration.....	68
Haematocrit	69
Serum Albumin.....	70
Morbidity Data.....	70
Data Analysis	71
Statistical Analysis of Variables.....	71
Analysis of 24-hr Dietary Recall.....	71
Anthropometric Analysis.....	72
Qualitative Study	74
Limitation of the Study.....	75
4 RESULTS AND DISCUSSIONS.....	78
The Study Area.....	78
Physical Setting.....	78
Climate.....	82
Administration of the District.....	83
Population.....	84
Occupation	84
Socio-Economic Aspects	86
Health Facilities and Status.....	87
Characteristics of Study Households.....	89
Family Structure.....	89
Educational Level.....	94
Occupation.....	95
Household Income.....	98
Household Expenditures	102
Economic Index.....	104
Land Utilisation.....	107
Housing and Sanitation.....	108
Description of the Study Children.....	114
Age and Gender.....	114
Anthropometry.....	114
Soil-Transmitted Helminths Infestation.....	117
Illnesses.....	121
Breastfeeding.....	127



Drop-Out Children.....	130
Impact on Anthropometry of Study Children.....	132
Weight Change.....	132
Length/Height Change.....	141
Weight-for-Age Change in terms of z-Score.....	148
Height-for-Age Change in terms of z-Score.....	154
Weight-for-Height Change in terms of z-Score.....	159
Head Circumferences.....	164
Mid-Upper-Arm Circumference	166
Measurement of Skinfold Thickness.....	168
Prevalence of Malnutrition.....	177
Impact on Biochemical Parameters of Study Children.....	185
Haemoglobin Levels.....	185
Haematocrit Values.....	185
Prevalence of Anaemia.....	185
Plasma Albumin Levels and Serum Albumin Deficiency.....	188
Impact of Milk Supplementation on the Diet of Study Children.....	191
Sources of Energy and Protein By Food Groups.....	192
Daily Intake of Energy and Nutrients.....	207
Factors Affecting the Changes in Weight and Height of Study Children.....	248
Changes in Weight.....	248
Changes in Height.....	248
Factors Affecting the Effect of Milk Supplementation on Weight and Height Changes.....	251
Comparison Between 3-kg Group and Control Group.....	251
Characteristics of Study Children.....	251
Characteristics of Household of Study Children.....	267
Comparison Between 1-kg Group and Control Group.....	278
Characteristics of Study Children.....	278
Characteristics of Household of Study Children.....	286
Some Anthropological Aspects of the Study Children	294
Care of the Children.....	294
Usual Diet of Children.....	303
Personal Hygiene.....	309
Physical Environment.....	310



	Perception of the Mothers Regarding the Milk Supplement.....	314
	Summary.....	321
5	SUMMARY AND RECOMMENDATIONS.....	324
	Summary.....	324
	Impact on Anthropometry.....	325
	Impact on Haematology and Biochemistry.....	327
	Impact on Dietary Intake.....	328
	Factors Affecting the Effects of Milk Supplementation.....	330
	Recommendations.....	334
	Amount of Milk Supplement.....	334
	Selection Criteria.....	334
	Deworming.....	335
	Breastfeeding.....	335
	Nutrition and Health Education.....	336
	REFERENCES.....	337
	APPENDIX.....	358
	BIOGRAPHICAL SKETCH.....	359

LIST OF TABLES

Tables		Page
1	Nutritional Surveys on Prevalence of Protein-Energy Malnutrition among Preschoolers in Malaysia.....	3
2	Prevalence of Anaemia amongst Children of Various Communities.....	8
3	Characteristics of the Households of Study Children.....	90
4	Main Occupations of Household Heads.....	96
5	Household Economic Indicators.....	100
6	Percentage Contribution of Various Items to the Monthly Household Expenditure.....	105
7	House Ownership and Basic Household Amenities.....	109
8	Distribution of Study Children by Gender.....	115
9	Distribution of Study Children by Age-Groups.....	115
10	Prevalence of Soil-Transmitted Helminths Infestations amongst the Study Groups at the Start and Mid-Stage of the Study.....	119
11	Comparison between the Intensity of <i>Ascaris Lumbricoides</i> Infestation amongst the Study Groups at the Start and Mid-Stage of the Study.....	122
12	Comparison between the Intensity of <i>Trichuris Trichiura</i> Infestation amongst the Study Groups at the Start and Mid-Stage of the Study.....	123
13	Proportion of Children Sick During the Study Period by Groups and Types of Illnesses.....	124
14	Number of Sick Days During the Study Period by Study Groups and Illnesses.....	126

15	Proportion of Study Children Breastfed at Various Stages of the Study.....	128
16	Number of Times of Breastfeeding Per Day at Various Stages of the Study.....	129
17	Initial and Final Weight of Children by Study Groups, and Results of one-way ANOVA and t-test Comparisons.....	133
18	Mean Cumulative Changes in Weight (kg) for Each Month of Study.....	135
19	Effect of Supplementation on Weight Increment and the Rate of Weight Increment.....	138
20	Initial and Final Height Values of Children by Study Groups, and Results of one-way ANOVA and t-test Comparisons.....	142
21	Mean Cumulative Changes in Height (cm) for Each Month of Study.....	143
22	Initial and Final Mean z-scores for Weight-for-Age by Study Groups, and Results of one-way ANOVA and t-test Comparisons.....	149
23	Mean Cumulative Changes in z-scores for Weight-for-Age for Each Month of Study.....	151
24	Initial and Final Mean z-scores for Height-for-Age by Study Groups, and Results of one-way ANOVA and t-test Comparisons.....	155
25	Mean Cumulative Changes in z-scores for Height-for-Age for Each Month of Study.....	157
26	Initial and Final Mean z-scores for Weight-for-Height by Study Groups, and Results of one-way ANOVA and t-test Comparisons.....	160
27	Mean Cumulative Changes in z-scores for Weight-for-Height for Each Month of Study.....	162
28	Initial and Final Mean Head Circumferences (cm) of Children by Study Groups, and Results of one-way ANOVA and t-test Comparisons.....	165

29	Initial and Final Mean Mid-Upper Arm Circumferences (cm) of Children by Study Groups, and Results of one-way ANOVA and t-test Comparisons.....	167
30	Initial and Final Mean Triceps Skinfold Thickness (mm) of Children by Study Groups, and Results of one-way ANOVA and t-test Comparisons.....	170
31	Initial and Final Mean Mid-Upper Arm Muscle Area (sq. mm) by Study Groups, and Results of one-way ANOVA Comparisons.....	173
32	Initial and Final Mean Mid-Upper Arm Muscle Circumference (mm) by Study Groups, and Results of one-way ANOVA Comparisons.....	174
33	Initial and Final Mean Mid-Upper Arm Muscle Fat (sq. mm) for Children, and Results of one-way ANOVA Comparisons.....	176
34	Initial and Final Mean Subscapular Skinfold Thickness (mm) of Children by Study Groups, and Results of one-way ANOVA and t-test Comparisons.....	178
35	Distribution of Children by Initial and Final Nutritional Status (WHO Classification by Weight-for-Age).....	179
36	Distribution of Children by Initial and Final Nutritional Status (WHO Classification by Height-for-Age).....	180
37	Distribution of Children by Initial and Final Nutritional Status (WHO Classification by Weight-for-Height).....	181
38	Haemoglobin, Haematocrit Values and Prevalence of Anemia at Various Stages of the Study.....	186
39	Serum Albumin Values and Prevalence of Serum Albumin Deficiency of Study Groups at Various Stages of the Study.....	189
40	Energy Consumption by according to Food Groups as a Percentage of RDA at Various Stages of the Study.....	193
41	Protein Consumption according to Food Groups as a Percentage of RDA at Various Stages of the Study.....	200

42	Mean Daily Energy intake of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA and t-test Comparisons.....	208
43	Mean Energy intake as % of RDA of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA and t-test Comparisons.....	209
44	Mean Energy Intake (Kcal) from Milk Supplement Consumed by Study Children at Various Stages of Evaluation.....	212
45	Mean Energy Intake as % of RDA from Milk Supplement Consumed by Study Children at Various Stages of Evaluation.....	212
46	Percentage of the Total Daily Energy Intake of Study Children Provided by Milk Supplement at Various Stages of Study.....	213
47	Mean Daily Protein Intake of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	215
48	Mean Protein Intake as % of RDA of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	216
49	Mean Protein Intake (g) from Milk Supplement Consumed by Study Children at Various Stages of Evaluation.....	219
50	Mean Protein Intake as % of RDA from Milk Supplement Consumed by Study Children at Various Stages of Evaluation.....	219
51	Percentage of the Total Daily Protein Intake of Study Children Provided by Milk Supplement at Various Stages of Study.....	220
52	Mean Daily Fat Intake (g) of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	222
53	Proportion of Energy Intake from Protein, Carbohydrate and Fat.....	224
54	Mean Calcium Intake as % of RDA of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	225



55	Mean Iron Intake as % of RDA of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	226
56	Mean Niacin Intake as % of RDA of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	227
57	Mean Thiamin Intake as % of RDA of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	228
58	Mean Riboflavin Intake as % of RDA of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	229
59	Mean Vitamin A Intake as % of RDA of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	230
60	Mean Vitamin C Intake as % of RDA of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	231
61	Nutrients Provided by Milk Supplement to the Children's Diet.....	235
62	Diet Rating of Children by Study Groups at Various Stages of Evaluation, and Results of one-way ANOVA Comparisons.....	237
63	the Effect of Supplementation on Energy and Protein (% RDA) Intake.....	244
64	the Effect of Supplementation on Other Nutrients Intake (% of RDA).....	246
65	Step-Wise Regression Models: Factors Affecting Change in Weight.....	249
66	Step-Wise Regression Models: Factors Affecting Change in Height.....	249
67	Effect of Supplementation on Incremental Weight (kg) of Study Children by Age Groups (3-kg vs. Control Group).....	252



68	Effect of Supplementation on Incremental Height (cm) of Study Children by Age Groups (3-kg vs. Control Group).....	252
69	Effect of Supplementation on Incremental Weight (kg) of Study Children by Gender (3-kg vs. Control Group).....	255
70	Effect of Supplementation on Incremental Length/Height (kg) of Study Children by Gender (3-kg vs. Control Group).....	255
71	Effect of Supplementation on Incremental Weight (kg) of Study Children by Initial z-score for Weight-for-Age (3-kg vs. Control Group).....	256
72	Effect of Supplementation on Incremental Height (cm) of Study Children by Initial z-score for Height-for-Age. (3-kg vs. Control Group).....	256
73	Growth Status of Study Children (Control and 3-kg Group) at the Beginning of Supplementation Classified With Reference to Weight-for-Age and Height-for-Age.....	259
74	Effect of Supplementation on Incremental Weight (kg) of Study Children by Initial z-score for Weight-for-Height (3-kg vs. Control Group).....	260
75	Effect of Supplementation on Incremental Weight (kg) of Study Children by Breastfeeding Status at the Beginning of the Study (3-kg vs. Control Group).....	260
76	Proportion of Study Children by Age-Groups Breastfed at the Start of the Study.....	262
77	Effect of Supplementation on Incremental Weight (kg) of Study Children by Presence of Helminthic Infestation among the Study Children (3-kg vs. Control Group).....	264
78	Effect of Supplementation on Incremental Length/Height (cm) of Study Children by Presence of Helminthic Infestation among the Study Children (3-kg vs. Control Group).....	264
79	Effect of Supplementation on Incremental Weight (kg) of Study Children by Number of Sick Days (3-kg vs. Control Group).....	266
80	Effect of Supplementation on Incremental Height (cm) of Study Children by Number of Sick Days (3-kg vs. Control Group).....	266
81	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Size (3-kg vs. Control Group).....	268

82	Effect of Supplementation on Incremental Weight (kg) of Study Children by Number of Children Below 7 Years in the Household (3-kg vs. Control Group).....	268
83	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Heads Educational Attainment (3-kg vs. Control Group).....	269
84	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Economic Index (3-kg vs. Control Group).....	272
85	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Income Classification (3-kg vs. Control Group).....	272
86	Effect of Supplementation on Incremental Weight (kg) of Study Children by Per Capita Household Income (3-kg vs. Control Group).....	273
87	Effect of Supplementation on Incremental Weight (kg) of Study Children by Per Capita Household Economic Index (3-kg vs. Control Group).....	273
88	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Expenditure (3-kg vs. Control Group).....	274
89	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Dependency Ratio (3-kg vs. Control Group).....	274
90	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Food Expenditure (3-kg vs. Control Group).....	275
91	Effect of Supplementation on Incremental Weight (kg) of Study Children by % of Household Income Spent on Food (3-kg vs. Control Group).....	275
92	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Land Utilisation (3-kg vs. Control Group).....	277
93	Effect of Supplementation on Incremental Weight (kg) of Study Children by Mother's Working Status (3-kg vs. Control Group).....	277



94	Effect of Supplementation on Incremental Weight (kg) of Study Children by Age Groups (1-kg vs. Control Group).....	279
95	Effect of Supplementation on Incremental Height (cm) of Study Children by Age Groups (1-kg vs. Control Group).....	279
96	Effect of Supplementation on Incremental Weight (kg) of Study Children by Gender (1-kg vs. Control Group).....	281
97	Effect of Supplementation on Incremental Length/Height (kg) of Study Children by Gender (1-kg vs. Control Group).....	281
98	Effect of Supplementation on Incremental Weight (kg) of Study Children by Initial z-score for Weight-for-Age (1-kg vs. Control Group).....	282
99	Effect of Supplementation on Incremental Height (cm) of Study Children by Initial z-score for Height-for-Age (1-kg vs. Control Group).....	282
100	Effect of Supplementation on Incremental Weight (kg) of Study Children by Initial z-score for Weight-for-Height (1-kg vs. Control Group).....	283
101	Effect of Supplementation on Incremental Weight (kg) of Study Children by Breastfeeding Status at the Beginning of the Study (1-kg vs. Control Group).....	283
102	Effect of Supplementation on Incremental Weight (kg) of Study Children by Presence of Helminthic Infestation among the Study Children (1-kg vs. Control Group).....	284
103	Effect of Supplementation on Incremental Weight (kg) of Study Children by Number of Sick Days (1-kg vs. Control Group).....	284
104	Effect of Supplementation on Incremental Length/Height (cm) of Study Children by Breastfeeding Status at the Beginning of the Study (1-kg vs. Control Group).....	285
105	Effect of Supplementation on Incremental Length/Height (cm) of Study Children by Presence of Helminthic Infestation among the Study Children (1-kg vs. Control Group).....	285
106	Effect of Supplementation on Incremental Height (cm) of Study Children by Number of Sick Days (1-kg vs. Control Group).....	287

107	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Size (1-kg vs. Control Group).....	287
108	Effect of Supplementation on Incremental Weight (kg) of Study Children by Number of Children Below 7 Years in the Household (1-kg vs. Control Group).....	288
109	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Heads Educational Attainment.....	288
110	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Economic Index.....	289
111	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Income Classification.....	289
112	Effect of Supplementation on Incremental Weight (kg) of Study Children by Per Capita Household Income.....	290
113	Effect of Supplementation on Incremental Weight (kg) of Study Children by Per Capita Household Economic Index.....	290
114	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Expenditure.....	291
115	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Dependency Ratio (1-kg vs. Control Group).....	291
116	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Food Expenditure (1-kg vs. Control Group).....	292
117	Effect of Supplementation on Incremental Weight (kg) of Study Children by % of Household Income Spent on Food (1-kg vs. Control Group).....	292
118	Effect of Supplementation on Incremental Weight (kg) of Study Children by Household Land Utilisation (1-kg vs. Control Group).....	293
119	Effect of Supplementation on Incremental Weight (kg) of Study Children by Mother's Working Status (1-kg vs. Control Group).....	293

LIST OF FIGURES

Figure		Page
1	Conceptual Framework of the Study.....	20
2	A Pathway Showing Some of the Potential Benefits of the Supplementary Feeding Programme.....	30
3	Map of Peninsular Malaysia.....	79
4	Map of Perak State.....	80
5	Map of Kerian District.....	81
6	Percentage Distribution by Age and Gender of Members of Study Households.....	92
7	A Comparison of Weight-for-Age of Malay Preschool Children, Peninsular Malaysia (Sexes Combined).....	116
8	A Comparison of Height-for-Age of Malay Preschool Children, Peninsular Malaysia (Sexes Combined).....	118
9	Mean Cumulative Changes in Weight (kg) for Each Month of Study.....	136
10	Linear Regression Models of Cumulative Changes in Weight vs.. Period of Supplementation.....	140
11	Mean Cumulative Changes in Height (Cm) for Each Month of Study.....	144
12	Linear Regression Models of Cumulative Changes in Length/Height vs. Period of Supplementation.....	147
13	Mean Cumulative Changes in z-scores for Weight-for-Age for Each Month of Study.....	152
14	Mean Cumulative Changes in z-scores for Height-for-Age for Each Month of Study.....	158
15	Mean Cumulative Changes in z-scores for Weight-for-Height for Each Month of Study.....	163

16	Energy Consumption by Food Groups as a Percentage of RDA of the Children	194
17	Protein Consumption by Food Groups as a Percentage of RDA of the Children.....	201
18	Energy and Protein Contribution by Milk Supplement to the Children's RDA intake.....	243



Abstract of thesis submitted to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Doctor of Philosophy.

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By

KOH CHU SING

AUGUST 1997

Chairman: Dr. Khor Geok Lin

Faculty: Biomedical and Health Sciences

The aim of the study is to determine the effectiveness of the milk supplementation in improving the nutritional status of undernourished preschool children. Three comparable experimental groups of undernourished preschool children (n=458), ages one to four years old, were selected. Children in the "1-kg group" were provided with one kg of milk powder per month for a period of nine months, while those in the "3-kg group" were given three kg of the supplement.

At the start of the study, there was no significant difference in the anthropometric measurements, biochemical and haematological parameters, as well as the dietary intake of the children in the three groups. The three groups



also have comparable household composition, socio-economic characteristics, and housing and sanitation levels.

After the nine months of milk supplementation, the children in the 3-kg group gained significantly higher weight, height, weight-for-age, and weight-for-height compared to those in the 1-kg and the control groups.

Within the 3-kg group, there was higher weight gain attained by children who were more seriously underweight compared to those who were less seriously underweight. Children at two years and below showed more length or height gain than those aged three and four years. Meanwhile, children aged two years and above showed a better gain in their weight compared to the one year old. A significantly higher weight gain was found only among non breast-fed children, while a higher length or height gain was found among children who did not have helminthic infestation.

Comparing the 1-kg and control groups, the study showed that, after the nine months of supplementation, there was significantly higher increment in the height-for-age in the 1-kg group; nonetheless there was no significant differences in the gain in weight, height, weight-for-age, and weight-for-height between the 1-kg and the control group.

The result of this study shows that the present monthly provision of one kg of milk supplement, distributed by the Ministry of Health, Malaysia aimed at bringing about an improvement in the nutritional status of the undernourished preschool children, is inadequate. It is suggested that 3 kg of milk powder per month is an effective amount of supplement that will bring about an improvement in the nutritional status of the undernourished children.



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Objektif kajian ini ialah untuk menentukan keberkesanan rancangan susu tambahan ke atas status pemakanan murid-murid pra-sekolah yang kekurangan zat makanan. Kanak-kanak yang berumur di antara satu hingga empat tahun dipilih sebagai subjek kajian dalam tiga kumpulan yang berlainan. Kumpulan 1-kg menerima susu tepung 1-kg sebulan untuk tempoh sembilan bulan sementara kumpulan 3-kg merangkumi dibekali susu tepung sebanyak 3-kg sebulan. Kumpulan kawalan tidak menerima sebarang susu tepung tambahan.

Di awal kajian, didapati bahawa tidak ada sebarang perbezaan yang nyata bagi ketiga-tiga kumpulan kanak-kanak dari segi pengukuran antropometri, ciri-ciri biokimia, ciri hematologi serta corak pengambilan makanan. Keadaan



rumah tangga, ciri-ciri sosio-ekonomi, keadaan perumahan dan kebersihan adalah juga setara bagi kesemua subjek kajian dalam ketiga-tiga kumpulan.

Keputusan kajian selepas sembilan bulan menunjukkan bahawa kanak-kanak dalam kumpulan 3-kg mempunyai penambahan berat, ketinggian, berat untuk umur, dan berat untuk ketinggian yang signifikansi lebih banyak berbanding dengan dengan kumpulan 1-kg dan kumpulan kawalan.

Bagi kumpulan 3-kg, penambahan berat untuk kanak-kanak kekurangan berat badan adalah lebih banyak bagi mereka yang mengalami keadaan yang lebih serius berbanding dengan kes yang kurang serius. Untuk ketinggian pula, kanak-kanak berumur dua tahun dan ke bawah memberi penambahan yang lebih banyak berbanding dengan subjek yang berumur tiga dan empat tahun. Sementara itu, kanak-kanak berumur dua tahun dan ke atas memperolehi penambahan berat badan yang lebih banyak apabila berbanding dengan mereka yang berumur satu tahun. Penambahan berat badan yang signifikansi hanya dijumpai bagi kanak-kanak yang tidak disusui oleh susu ibu. Penambahan ketinggian yang nyata adalah bagi kanak-kanak yang tidak ada masalah penjangkitan cacing helmintik sahaja.

Penambahan ketinggian untuk umur adalah nyata lebih banyak bagi kumpulan 1-kg berbanding dengan kumpulan kawalan. Walaupun demikian,

tidak dijumpai sebarang perbezaan yang signifikan untuk penambahan berat, ketinggian, berat untuk umur dan berat untuk ketinggian bagi kedua-dua kumpulan 1-kg dan kawalan.

Kajian ini merumuskan bahawa rancangan kerajaan sewaktu ini yang hanya membekalkan 1-kg susu tepung sebulan untuk setiap kanak-kanak di bawah umur kemasukan persekolahan adalah tidak mencukupi bagi hasrat memperbaiki status pemakanan. Ditunjukkan dalam kajian ini bahawa bagi mempertingkatkan status nutrisi kanak-kanak, susu tepung perlu ditambahkan sehingga sekurang-kurangnya 3-kg sebulan untuk mencapai maklumat.

CHAPTER 1

INTRODUCTION

Preamble

Undernutrition and poor health in children have permanent and deleterious effects on their mental and physical powers, which will limit their eventual productivity and consequent contribution to society. High morbidity and widespread malnutrition in young children are common symptoms in the disadvantaged communities of Third World countries (ACC/SCN, 1993).

Within these adverse socio-economic settings, supplementary feeding serves as the main thrust of nutritional activity in attempts to improve child health and nutrition. The results of these food supplementation programmes are inconsistent; while some feeding programmes have succeeded in alleviating malnutrition, some others have failed to show the expected impact on growth and morbidity in the target groups (Ghassemi, 1992a; 1992b).