



## TABLE OF CONTENTS

ENDORSEMENT .....	ii
STATEMENT LETTER .....	iii
DECLARATION .....	iv
ACKNOWLEDGEMENT .....	v
TABLE OF CONTENTS .....	vi
LIST OF FIGURES .....	ix
LIST OF TABLES .....	x
LIST OF ANNEX .....	xi
LIST OF ABBREVIATIONS .....	xi
ABSTRACT .....	xii
INTISARI .....	xiii
CHAPTER I INTRODUCTION .....	1
A. Background .....	1
B. Formulation of the problem .....	4
C. Objective of the study .....	4
D. Significance of the study .....	5
E. Originality of the study .....	6
CHAPTER II LITERATURE REVIEW .....	9
A. Theoretical Basis .....	9
1. Body Composition .....	9
2. Intrauterine Growth .....	14
3. The influence of maternal factor on neonatal body composition .....	17
4. Intrauterine Growth and Neonatal Body Composition .....	24
5. Postnatal preterm growth and changes in body composition .....	27
B. Thoritical framework .....	33
C. Study Framework .....	34
D. Hypothesis .....	35
CHAPTER III METHODS .....	36
A. Research Design .....	36



B. Variables of the study.....	36
C. Time and place of the study .....	37
D. Subjects of Study.....	37
1. Population and Samples.....	37
2. Inclusion/Exclusion criteria.....	37
3. Sample Size .....	38
E. Operational Definitions .....	39
F. Ethics of the Study .....	42
G. Procedures .....	42
1. IGF-1 Measurement.....	42
2. DXA Measurement.....	42
3. Anthropometric Measurement.....	44
4. Gestational Age Measurement.....	44
5. Hemoglobin Measurement .....	45
H. Statistical Analysis .....	45
1. Descriptive analysis.....	45
2. Simple regression analysis.....	46
3. Multiple regression analysis .....	46
CHAPTER IV RESULTS AND DISCUSSION .....	47
A. Results .....	47
1. Description of study sample .....	47
2. Factor influenced body composition of preterm infants at birth .....	50
3. Body composition of preterm at term corrected age and related factor.....	54
B. Discussion .....	60
1. Description of study subjects.....	61
2. Factors influenced body composition of preterm infants at birth.....	63
3. Body composition of preterm at term corrected age and related factor.....	68
C. Limitation of the study .....	74
CHAPTER V CONCLUSIONS AND FUTURE DIRECTION.....	76



A. Conclusion.....	76
B. Recommendation.....	76
CHAPTER VI SUMMARY .....	78
A. Background .....	78
B. Objective .....	80
C. Material and methods .....	81
D. Results .....	83
E. Discussion .....	85
F. Conclusions .....	89
REFERENCES .....	91
ANNEXES.....	101



## LIST OF FIGURES

Figure 1. Body composition model in neonates .....	10
Figure 2. Theoretical framework was modified from.....	33
Figure 3. Study framework for the correlation of postnatal weight gain and body composition at term corrected age .....	34
Figure 4. Sample flowchart.....	48



## LIST OF TABLES

Table 1. Previous studies on body composition in preterm infants .....	7
Table 2. Research Variables and Operational Definition .....	39
Table 3. Maternal characteristics of the study subjects .....	49
Table 4. Perinatal characteristics of the study subjects .....	50
Table 5. Preterm infant body composition and anthropometry in relation to maternal and neonatal characteristics (N=60) .....	52
Table 6. Associations of maternal and neonatal variables with %FM of preterm newborns (N=60) .....	53
Table 7. Body composition and anthropometry measurements preterm infants at term corrected age versus term infants .....	54
Table 8. Comparison of anthropometry and body composition between term appropriate for gestational age (AGA), term small for gestational age (SGA), preterm AGA and preterm SGA infants .....	56
Table 9. Body composition of preterm infants at term corrected age according to sex and intra-uterine growth (N=73) .....	58
Table 10. Factors associated with fat mass percentage at term corrected age (N=73) .....	58



## LIST OF ANNEX

Annex 1. Dubowitz score.....	101
Annex 2. Ethics committee approval.....	103
Annex 3. Research permit.....	104
Annex 4. Inform consent .....	105
Annex 5. Neonates data questionnaire.....	108
Annex 6. Maternal data questionnaire .....	119
Annex 7. DXA Examination.....	127



## LIST OF ABBREVIATIONS

AGA	appropriate for gestational age
BIA	bioelectric impedance analysis
BMI	body mass index
BP	blood pressure
cm	centimeter
DXA	dual energy X-ray absorptiometry
EDTA	ethylenediaminetetraacetic acid
ELISA	enzyme-linked immunosorbent assay
FFM	free fat mass
FM	fat mass
GA	gestational age
G	gram
GWG	gestational weight gain
HC	head circumference
IGF	insulin-like growth factor
IGFBP	insulin-like growth factor binding protein
IOM	Institute of Medicine
IUGR	intrauterine growth retardation
kg	kilogram
LM	lean body mass
MRI	magnetic resonance imaging
NICU	neonatal intensive care unit
SD	standard deviation
SEP	socioeconomic position
SGA	small for gestational age
TBW	total body water