

# Protective Effect of Exclusive Breastfeeding for Overweight/Obesity in Children with High Birth Weight

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## INTRODUCTION

The increase in the prevalence of childhood overweight and obesity, which began in the 1970s, has grown into a global epidemic problem. Obesity persists from childhood to adolescence and into adulthood and is a leading cause of health problems. Extensive epidemiological studies have demonstrated that obesity was an important risk factor for many chronic diseases in adulthood, including diabetes mellitus, stroke, ischemic heart disease, hypertension. Especially, children in the upper ranges of birth weight also had an increased BMI in adulthood, showing signs of tracking. The tendency of birth weight to determine growth status throughout childhood has been demonstrated in several studies. Over the previous decade, many research has indicated an association between breastfeeding and childhood obesity. However, the preventive effect of breastfeeding on childhood obesity is still inconsistent. Therefore, the aim of this study was to investigate the weight growth trajectory of children of birth cohort data utilizing the Korean National Health Information Database (KNHID), who were followed longitudinally from birth to 6 years of age.

## MATERIAL AND METHODS

### Study Design

- A retrospective cohort study was conducted between January 1, 2008 and December 31, 2016 utilizing data from the National Health Insurance Service of Korea (KNHIS)
- The selected 38,039 infants was followed until the end of 2016, provided that participants were completely eligible for all health check-ups from birth to 6 years of age
- Infants were categorized by birth weight for gestational age status reference percentile derived for singleton infants from 1989 US Vital Statistics by Zhang and Bowes Using these reference data

- Low birth weight (LBW): defined as birth weight  $\leq 2,500g$
- Normal birth weight (NBW); defined as birth weight  $2,500 g < < 4,000g$

- High birth weight (HBW): defined as birth weight  $>4,000 g$
- At each check-up period, multiple logistic regression was used to investigate the association between three birth weight status and growth development categorized into 3 groups, overweight/obesity, normal and underweight.

### Statistical Methods

- Differences between sex and infant diet were compared by Repeated measures ANOVA. Analyses were performed in SAS statistical package version 9.4

## RESULTS

Table 1. General Characteristics by birth weight groups

Birth Weight Group		N (%) or Mean (SD)			p-value
		LBW(n=2312)	NBW (n=34332)	HBW (n=1405)	
Sex	M	1012 (44.0)	17469 (50.9)	899 (64.0)	<0.001
	F	1290 (56.0)	16863 (49.1)	506 (36.0)	
SES*	1	67 (2.9)	967 (2.8)	39 (2.8)	0.96
	2	514 (22.3)	7612 (22.2)	326 (23.2)	
	3	643 (27.9)	9831 (28.6)	407 (29.0)	
	4	584 (25.4)	8663 (25.2)	334 (23.8)	
	5	494 (21.5)	7259 (21.1)	299 (21.3)	
Breastfeed	Breastfeed only	724 (40.3)	16487 (60.5)	673 (61.8)	<0.001
	Formula milk only	1071 (59.7)	10780 (39.5)	416 (38.2)	

\*SES: socioeconomic status—categorized SES into 5 groups: one group of medical aid beneficiaries and four groups with similar size of population

Figure 1. The mean of BMI at each check-up period by birth weight groups

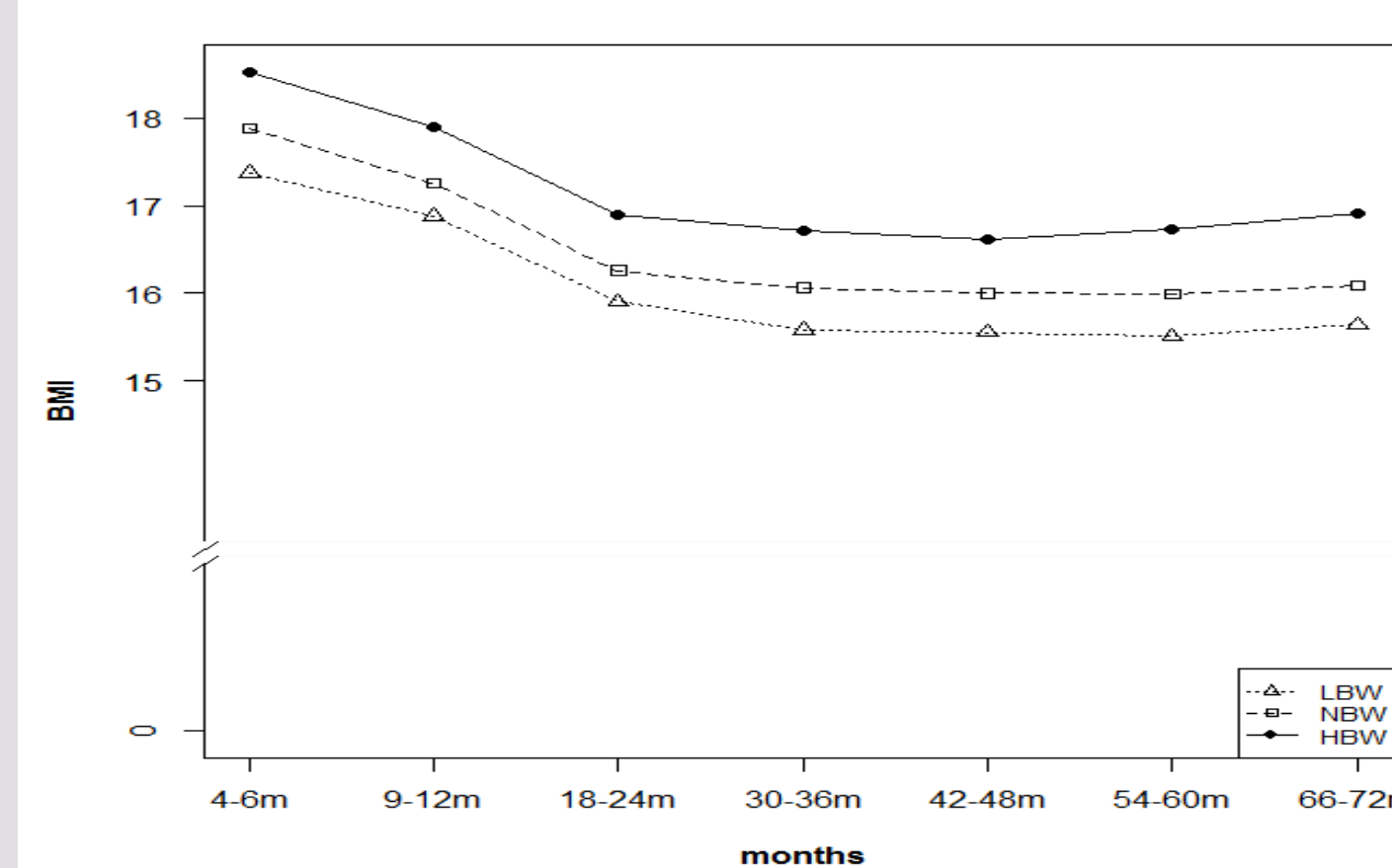


Figure 2. The prevalence of overweight/obesity at each check-up period by birth weight groups

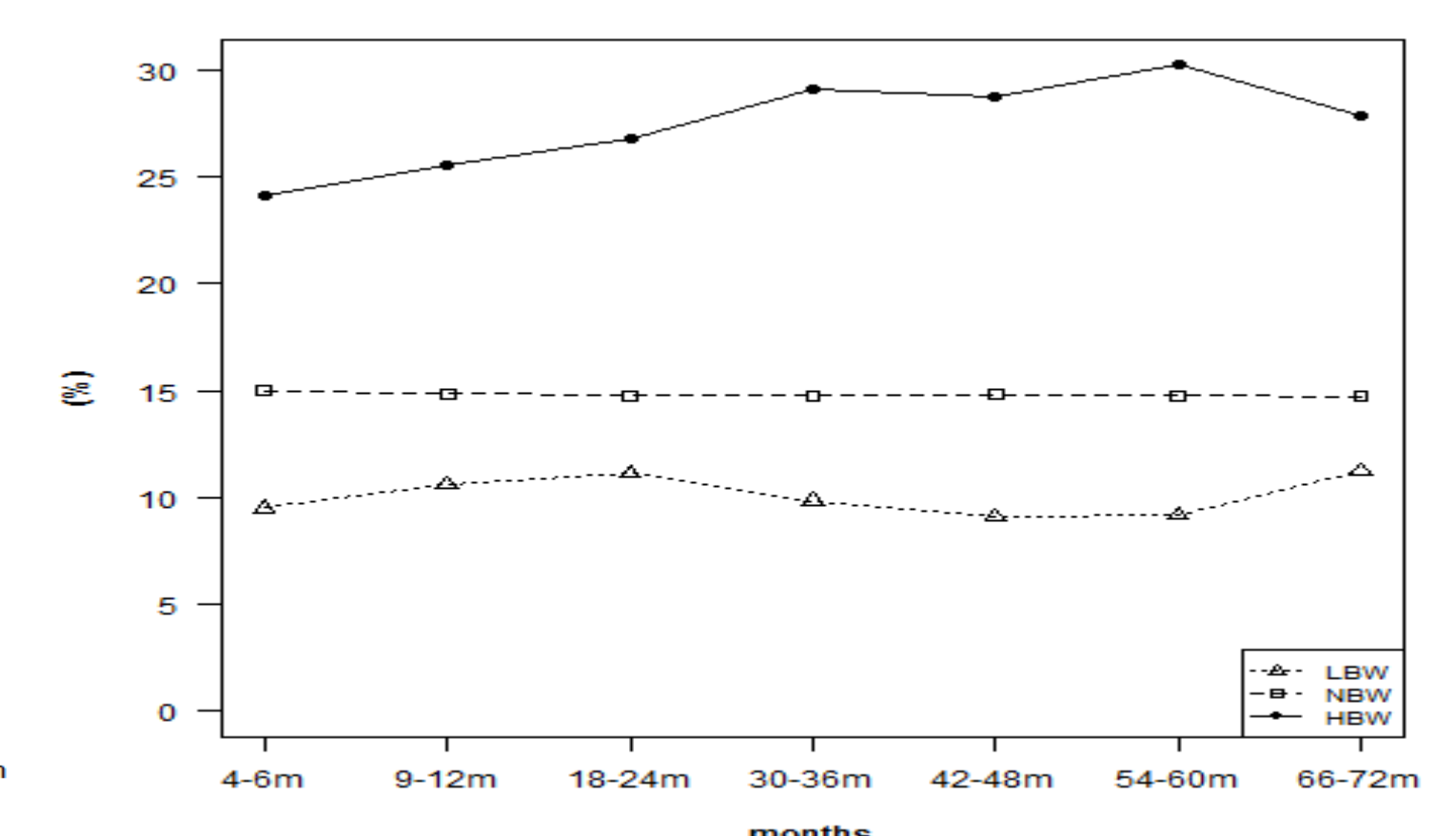


Table 2. The effects of breastfeeding on the risk of childhood overweight/obesity

Age (months)	OR & 95% C.I. <sup>1</sup>		
	LBW	NBW	HBW
4-6	0.83 (0.60 – 1.15)	1.05 (0.98 – 1.12)	1.13 (0.85 – 1.51)
9-12	0.73 (0.54 – 1.00)	0.73 (0.69 – 0.79)	0.69 (0.52 – 0.91)
18-24	0.67 (0.49 – 0.92)	0.61 (0.57 – 0.65)	0.54 (0.41 – 0.71)
30-36	0.74 (0.53 – 1.02)	0.75 (0.70 – 0.81)	0.73 (0.56 – 0.95)
42-48	0.91 (0.66 – 1.26)	0.85 (0.79 – 0.91)	0.76 (0.58 – 0.99)
54-60	1.17 (0.85 – 1.62)	0.87 (0.81 – 0.93)	0.69 (0.53 – 0.90)
66-72	1.23 (0.91 – 1.65)	0.87 (0.81 – 0.93)	0.79 (0.60 – 1.03)

## RESULTS & SUMMARY

HBW infants are highly likely to be overweight/obesity compared to NBW infants (OR 1.70~2.35) and LBW infants are highly likely to be underweight (OR 1.69~2.20) through 6 years of age. The risk of overweight/obesity decreases significantly if HBW infant get exclusively breast-feeding for 6 months (OR 0.54~0.79).

## CONCLUSION

High birth weight status is related to overweight/obesity during early childhood. Exclusively breastfeeding is a significant protective factor against overweight/obese in children with HBW

