

TELEVISION VIEWING IN EARLY CHILDHOOD PREDICTS ADULT BODY MASS INDEX

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Objectives To examine the effects of duration, timing and type of television (TV) viewing at age 5 years on body mass index (BMI) in adult life.

Study design and methods 1970 British Birth Cohort, followed up at 5 (N = 13,135), 10 (N = 14,875), and 30 years (N = 11,261).

Outcome measures Weekday and weekend TV viewing at 5 years, type of programs, and maternal attitudes toward TV at age 5 years. BMI z-score at 10 and 30 years.

Results Mean daily hours of TV viewed at weekends predicted higher BMI z-score at 30 years (coefficient = 0.03, 95% CI: 0.01, 0.05, $P = .01$) when adjusted for TV viewing and activity level at 10 years, sex, socioeconomic status, parental BMIs, and birth weight. Each additional hour of TV watched on weekends at 5 years increased risk of adult obesity ($\text{BMI} \geq 30 \text{ kg/m}^2$) by 7% ($\text{OR} = 1.07$, 95% CI 1.01, 1.13, $P = .02$). Weekday viewing, type of program and maternal attitudes to TV at 5 years were not independently associated with adult BMI z-score.

Conclusions Weekend TV viewing in early childhood continues to influence BMI in adulthood. Interventions to influence obesity by reducing sedentary behaviors⁴⁰ must begin in early childhood. Interventions focusing on weekend TV viewing may be particularly effective. (*J Pediatr* 2005;147:429-35)

Obesity is the major public health challenge of the current day.¹ A typical child in the USA watches television (TV) for 2.5 hours each day.² Higher levels of TV viewing in early childhood and later childhood and adolescence have been associated with higher body mass index (BMI) in cross-sectional studies³⁻⁷ and in longitudinal studies confined to childhood and adolescence.⁸⁻¹¹ Viewing 4 or more hours of TV per day has been suggested to be particularly associated with childhood obesity.^{5,6} As a result, public health interventions to prevent childhood obesity frequently include efforts to reduce duration of TV viewing.¹² Only 1 study has addressed the long-term effects of childhood TV viewing on adult BMI, reporting that mean weeknight TV viewing between 5 and 15 years significantly predicted higher BMI at 26 years.¹³

TV viewing may increase BMI through displacing physical activity or through unhealthy food choices related to eating while watching or to food advertising.¹⁴ These effects may vary depending on timing and content of viewing and level of parental supervision. However, no studies have examined whether the timing of TV viewing or the type of programs viewed may differentially affect current or later BMI. We used data from the 1970 British Birth Cohort to investigate the hypotheses that higher early childhood TV watching during weekdays and weekends and more favorable parental attitudes toward TV was associated with increased BMI in adulthood.

METHODS

The 1970 British Cohort Study is a continuing, multidisciplinary longitudinal study that takes as its subjects all those living in Great Britain who were born in the week of April

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and editorial, p 417.

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BMI	Body mass index	TV	Television
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Table I. Daily TV viewing habits at 5 and 10 years

Variable	Category	Sample N		% (N)
5 years				
Television viewing Monday to Friday	Hours per day	8158	<2 hours	59 (5082)
			2-3.9 hours	35 (2987)
			≥4 hours	6 (520)
	Days watched after 6 PM	8104	0	60 (4834)
			1	11 (847)
			2	5 (405)
			3	3 (274)
			4	4 (315)
			5	18 (1429)
Television viewing Saturday and Sunday	Hours per day	8158	<2 hours	58 (4757)
			2-3.9 hours	32 (2612)
			≥4 hours	10 (856)
	Days watched after 6 PM	8518	Neither	64 (5111)
			1	19 (1522)
			2	17 (1336)
Programs viewed	Children's programming (excluding cartoons)	8158	Yes	94 (7673)
	Cartoons		Yes	93 (7569)
	Adult programming		Yes	83 (6771)
10 years				
Television viewing habit	Frequency	7350	Rarely or never	1 (63)
			Sometimes	20 (1461)
			Often	79 (5826)

5-11, 1970. A total of 16,567 babies born in England, Scotland, and Wales were enrolled,¹⁵ and subjects have been followed up at 5, 10, 16, 26 and 29-30 years of age. The sample was representative of the UK population in childhood, and attempts are ongoing to maintain the representativeness of the cohort by recruiting additional subjects immigrating to the UK who were born in the source week in 1970. At 30 years of age, 96.3% of the cohort identified themselves as white, with 0.6% black, 1.8% from South Asian ethnicities, 0.8% Chinese or other Asian, and 0.6% of mixed ethnicity. Data were obtained electronically from the UK Data Archive, University of Essex, UK, and SPSS code for cleaning the databases and deriving summary variables were obtained from the Centre for Longitudinal Studies, Institute of Education, London.¹⁶⁻¹⁹ Ethical review board approval was obtained by the original investigators but was not required for these analyses of anonymized data.

At 10 years of age (1980), 15,995 cohort members were traced and invited to participate, and data were obtained on 14,875 subjects. Response bias compared with the Birth survey showed no significant social class differences (gain of 1.7% in those with father in manual employment).²⁰ In 2000, when subjects were 29-30 years of age, 14,087 of an estimated 16,695 cohort members were traced and invited to participate, of whom 11,261 (68%) underwent interview.¹⁶ Marked efforts were made to recruit difficult-to-reach subjects, and loss of

those from lower social classes between the Birth and 30-year surveys was minor (3.9% loss from manual employment).¹⁶

Childhood Data

At 5 years, mothers provided data on the average number of hours per day that their child watched TV during the week (Monday to Friday) and weekends (Saturday and Sunday). Parents also reported the average number of days per week that their child watched TV after 6 PM during the week and weekend, and the type of TV programs they usually watched (categories being children's programs [excluding cartoons], cartoons or adult programming [including drama, comedy, quiz programs, sport, news or documentary programs]). Mothers were also asked to indicate agreement on a 5-point Likert scale for questions regarding their beliefs about children and TV as part of a wider 43 item set of questions on maternal beliefs about child rearing. Questions included the following: (1) "Young children who never see TV miss a lot that is of value," (2) "TV is a useful way of keeping the children amused," (3) "Young children pick up a lot of bad habits from TV," and (4) "Children under 5 should never be allowed to watch adult TV." Factor analysis of the 43 items by the investigators suggested that the 4 questions constituted a separate dimension indicating beliefs regarding the effects of TV on young children; weighted scores for this dimension converted to a z-score in which a higher score indicated

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