

PAPER

Public perceptions of the causes and prevention of obesity among primary school children

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OBJECTIVE: To investigate lay perceptions of the causes and prevention of obesity among primary school children.

DESIGN: A cross-sectional survey of randomly selected sample of adults in a shopping centre.

SUBJECTS: 315 adults in Melbourne, Australia.

MEASUREMENTS: Subjects completed a self-completion questionnaire, in which they rated the importance of 25 possible causes of obesity and the importance of 13 preventive measures on four-point scales: not important; quite important; very important; extremely important. Demographic information about the respondents' age, sex, marital status, education level and parental status was also collected.

RESULTS: The most important reported causes of childhood obesity were related to overconsumption of unhealthy food, parental responsibility, modern technology and the mass media. The most popular prevention activities were associated with specific actions aimed at children. Principal components analysis of the causes data revealed eight factors, provisionally named: parental responsibility, modern technology and media, overconsumption of unhealthy food, children's lack of knowledge and motivation, physical activity environment, lack of healthy food, lack of physical activity and genes. Two prevention factors were also derived, named government action and children's health promotion. Parents saw modern technology and media, and government activities as more important causes, and government policy as a more important means of prevention than nonparents and men. Women's responses tended to be similar to those of parents. There were few educational differences, although nontertiary educated respondents reported that modern technology and media were more important causes of obesity than did the tertiary educated.

CONCLUSION: The findings suggest that the public appears to hold quite sophisticated views of the causes and prevention of children's obesity. They suggest that a number of prevention strategies would be widely supported by the public, especially by parents.

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Introduction

Obesity is prevalent throughout the developed and developing world, with children as well as adults affected.¹ Among Australian children, the rate of overweight doubled and the rate of obesity trebled in the decade between 1985 and 1995.² Almost a quarter of Australian children aged between 2 and 17 years are currently overweight or obese.² The figures for other developed countries such as the United States and England are equally alarming, and like Australia, trend data suggest that there has been a dramatic increase in the prevalence of obesity over the past two decades.^{3,4} From a

public health perspective, these statistics are of concern because of the increased risks of a number of physical and psychosocial health conditions that are associated with obesity.¹ For example, there are growing concerns about the incidence of Type II diabetes in children and young adults.⁵

A wide range of behavioural, social and environmental factors has been suggested as potential drivers of the current obesity epidemic. These include, but are not limited to, changes in the consumption of fast foods and foods prepared away from home, increases in sedentary pursuits such as television viewing, the use of computers and other forms of electronic entertainment, reductions in walking and cycling as a means of transport, growing concerns about safety in public spaces and on our roads, increases in the availability and marketing of foods, reductions in physical education

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in schools and occupation-related physical activity and changes in the demands on parents' time and family life.⁶ Although it is self-evident that the increase in obesity is a result of changes in energy intake and/or energy expenditure, there is in fact relatively little empirical evidence regarding the specific factors that have led to the increases in obesity observed in recent decades.⁷

Given the lack of data on the specific causes of the obesity epidemic, it is perhaps not surprising that a number of different prevention strategies have been proposed by academic researchers, health professionals and government authorities to combat the epidemic of childhood obesity.^{8–10} These include educational strategies aimed at promoting healthy eating and increased physical activity, through to changes in the physical environment like changing the urban environment to make it safer for children to walk and even changes in government policies such as limiting food advertising to children. While a range of preventive strategies has been suggested, to our knowledge community views regarding the causes of childhood obesity and the most appropriate strategies to prevent it have not been canvassed. However, an understanding of lay views is important to determine the likely level of community support for preventive initiatives and to identify where there is a need to educate the community about the epidemic. Most previous studies of lay views of children's obesity have been confined to the causal roles of individual factors like parental control,^{11,12} the perceived consequences of obesity¹³ or restricted to the causal attributions of selected groups (eg fitness trainers).¹⁴

The aim of this study was to investigate adults' perceptions of the relative importance of a range of possible causes of childhood obesity and their views of the best ways to prevent childhood obesity. A secondary aim was to explore how these views vary according to gender, parental status and socioeconomic status.

Methods

Subjects and procedure

Over a 2-day period in November 2002, adults in a shopping centre in the South-Eastern suburbs of Melbourne, Australia were approached at random and asked to complete the questionnaire. However, this shopping complex services a large area of South-East Melbourne, which encompasses people from a range of socioeconomic backgrounds.¹⁵ Data were collected throughout the day and in the evening on a Friday and on a Saturday in an effort to capture shoppers from a variety of backgrounds (eg working men and women). A total of 315 adults completed the questionnaire, representing a response rate of 46% of those approached.

Measures

A questionnaire was developed to assess lay perceptions of the causes of obesity among primary school children and

strategies to prevent obesity among them. It was designed to be self-completed in 5–10 min. The questionnaire was pilot tested for clarity and comprehensibility prior to being administered to the survey sample.

The items included in the questionnaire were derived from a literature review regarding the causes and strategies to prevent childhood obesity.^{1,3,4,6,8–10} It included 25 possible causes of childhood obesity and 13 possible measures to prevent obesity. The individual items are listed in Tables 2 and 3, respectively. For each of the causes and preventive measures, subjects were asked to indicate how important they felt they were on a four-point scale; not important; quite important; very important; extremely important. In addition, respondents were asked to indicate their age, sex, marital status, education level and whether they were parents.

Data analysis

Basic univariate analyses (ie frequency counts) were performed to describe the distribution of responses for each item. To reduce the complexity of the data, the responses to items regarding the causes of childhood obesity were factor analysed via principal components analysis with varimax rotation. The analysis was repeated for the items regarding prevention. After inspection of the rotated prevention factors some items, which loaded on both the factors, were deleted. Factor scores were saved for further analysis. Cronbach's alphas were calculated to estimate the internal reliability of the factors. Plots of the factor scores showed that some were not normally distributed and all factors were subsequently transformed to z-scores. Two-way analyses of variance (sex by parental status and sex by education level) were conducted on each of the factor scores. An alpha level of 0.05 was used in the comparison of factor scores. Analyses were carried out using SPSS 11.0 for Windows.

Results

Profile of respondents

The demographic characteristics of the 315 respondents are described in Table 1. Although a convenience sample of shoppers, it did comprise people from different backgrounds, with more than one-third being men, and people of different ages, marital and parental status, and educational background represented. However, younger persons and those with tertiary qualifications were over-represented in the sample.

Beliefs about the causes of childhood obesity

Subjects' beliefs about the importance of the different potential causes of childhood obesity are presented in Table 2. The results of the univariate (frequency) analysis show that more than half of the adults surveyed felt overconsumption of fast foods and media promotion of

Table 1 Distribution of demographic characteristics of the respondents (N = 315)

Characteristic		Valid percentage	Valid total
Sex	Male	36	102
	Female	64	181
Age (y)	18–30	33	101
	31–40	20	61
	41–50	19	60
	51–65	20	63
	> 65	8	26
Education level	Primary school	1	2
	Some high school	6	18
	High school	29	88
	Technical or trade certificate	12	36
	University or tertiary qualifications	53	163
Marital status	Married	58	180
	Living together	5	16
	Separated	3	8
	Divorced	3	9
	Widowed	2	6
	Never married	30	94
Having children	No	47	146
	Yes	53	166

unhealthy foods to be extremely important as causes of obesity. While most of the causes listed in the questionnaire were considered to be at least very important by a significant majority of subjects, there were a number of causes that were considered to be not important or only quite important by many respondents. These included the following items: parent's don't care about being physically active, parent's don't care about healthy eating; lack of safe cycling and walking paths; lack of other safe places to be physically active; healthy foods are expensive; healthy foods often aren't available; genes; there is an overemphasis on academic work.

Beliefs about prevention strategies

The results of the univariate (frequency) analysis of the measures to prevent obesity presented in Table 3 show that there was widespread consensus about the desirability of several prevention activities, specifically the promotion of healthy eating during children's television viewing, the provision of healthy food at school, compulsory daily physical education at school, obesity prevention strategies that target nonobese as well as obese children, regular government funded healthy eating campaigns in the mass media and the highlighting of the energy content of foods on their labels. However, there was far less support for coercive measures such as the banning of food advertising during children's television programmes (although there was

support for firmer regulation of such advertising) or for an additional tax on high-fat foods. There were also many people who did not see a reduction in the portion sizes of take away (ie fast) foods as an important measure to prevent obesity.

Results of factor analyses

Eight factors with eigenvalues greater than unity were derived from the principal components analysis of the causes items. These are presented in Table 2, which includes details of the items loading on each factor and their internal consistency scores. Together, the eight factors accounted for 67% of the variance. Factor 1 was provisionally named 'parental responsibility', because the five items loading on it were related to parents' lack of knowledge and motivation. 'Modern technology and media' (factor 2) included four items about television viewing, the media and the use of modern technology. 'Overconsumption of food' (factor 3) included five items about fast foods, high-fat foods and oversized servings of foods. Factor 4 comprised three items and was labelled 'Children's lack of knowledge and motivation'. 'Physical activity environment' (factor 5) included two items regarding the lack of facilities for cycling and walking and safety. Factor 6 included two items and was labelled 'lack of healthy food'. Factor 7 with two items, was named 'lack of physical activity'. The final factor exhibited low internal reliability ($\alpha = 0.21$) and was thus not included in further analyses.

Factor analyses of the prevention items yielded two factors with eigenvalues greater than unity, which together accounted for 50% of the variance (Table 3). These were 'government action' (factor 1), which included five items concerned with taxation, banning advertising, the provision of safe recreational facilities and community-wide prevention initiatives. Factor 2 comprised four items broadly concerned with 'children's health promotion'.

Demographic differences in factor scores

The results of the analyses of variance of the factor scores are presented in Table 4. On two of the cause factors, 'modern technology and media' and 'physical activity environment', women had significantly higher scores than men, indicating that they considered these to be more important causes of childhood obesity. Conversely, women scored lower than did men on 'lack of physical activity'. With regard to the analyses by parental status, parents scored higher than did respondents who were not parents on 'modern technology and media', 'physical activity environment' and 'lack of physical activity'.

There was only one difference in terms of education level. Respondents who were not tertiary educated scored higher on 'modern technology and media', which indicated that they perceived this to be a more important cause of childhood obesity than did tertiary educated respondents

Table 2 Results of principal components analysis of lay perceptions of the importance of causes of obesity among primary school children

<i>Factor and items</i>	<i>Factor loadings</i>	<i>Not (%)</i>	<i>Quite (%)</i>	<i>Very (%)</i>	<i>Extremely (%)</i>
<i>Factor 1: Parental responsibility</i>					
Cronbach alpha: 0.85					
Percent of variance: 23.37%					
Parents don't know how to promote healthy eating	81	7	29	45	19
Parents don't know how to promote physical activity	80	9	29	45	17
Parents don't care about being physically active	80	10	36	34	20
Parents don't care about eating healthy	76	14	35	29	23
Parents aren't aware of the dangers of obesity	72	9	29	39	23
<i>Factor 2: Modern technology and media</i>					
Cronbach alpha: 0.78					
Percent of variance: 11.16%					
Watching too much television	84	7	20	31	43
Eating in front of the TV	74	9	17	36	38
Modern technology (eg cars, computers, video games)	72	6	18	37	39
Media promotion of unhealthy foods	66	3	13	33	52
<i>Factor 3: Overconsumption of food</i>					
Cronbach alpha: 0.74					
Percent of variance: 8.09%					
Eating too many high fat foods at home	66	3	16	45	37
Eating oversized servings of foods	66	11	30	42	17
Eating too many high fat foods at school	65	6	20	40	33
Children have too much money to spend on unhealthy food	60	12	27	36	25
Overconsumption of fast foods	52	3	10	37	50
<i>Factor 4: Children's lack of knowledge and motivation</i>					
Cronbach alpha: 0.72					
Percent of variance: 6.46%					
Children don't care about eating healthy	86	10	20	43	28
Children don't know about the dangers of obesity	78	9	15	48	28
Children don't care about being physically active	64	11	35	34	20
<i>Factor 5: Physical activity environment</i>					
Cronbach alpha: 0.86					
Percent of variance: 5.20%					
Lack of safe cycling and walking paths	87	28	26	30	17
Lack of other safe places to be physically active	85	27	30	30	13
<i>Factor 6: Lack of healthy food</i>					
Cronbach alpha: 0.79					
Percent of variance: 4.40%					
Healthy foods are expensive	88	31	25	28	15
Healthy foods often aren't available	86	40	27	25	8
<i>Factor 7: Lack of physical activity</i>					
Cronbach alpha: 0.63					
Percent of variance: 4.32%					
Lack of physical activity at school	79	15	33	33	19
Lack of physical activity outside school	75	5	25	43	27
<i>Factor 8</i>					
Cronbach alpha: 0.21					
Percent of variance: 4.02%					
Genes	88	12	45	31	12
There is an overemphasis on academic work	50	28	28	30	14

Factor loadings are expressed as whole numbers.

Table 3 Results of principal components analysis of lay perceptions of the importance of prevention of obesity among primary school children

Factor and items	Factor loadings	Not (%)	Quite (%)	Very (%)	Extremely (%)
<i>Factor 1: Government action</i>					
Cronbach alpha: 0.68					
Percent of variance: 35.17%					
High-fat foods should have an additional 5% tax	85	44	19	18	20
Give 5% tax incentives to manufacturers of healthy food	78	29	18	24	30
Advertising of high fat foods should be banned during children's viewing hours	63	13	27	26	33
The government should build more safe cycling and walking tracks	53	11	31	32	27
Obesity prevention actions should only be directed to children who are overweight, but not yet obese	38	39	22	24	16
<i>Factor 2: Children's health promotion</i>					
Cronbach alpha: 0.72					
Percent of variance: 14.80%					
Healthy eating should be promoted on children's TV	77	1	8	35	56
Obesity prevention actions should be directed to all children	73	3	16	33	49
More healthy food should be served in schools	72	2	9	34	55
Daily physical education in school should be compulsory	67	3	16	32	49
<i>Items not included/loading on more than one factor</i>					
The food industry should reduce the portion sizes of takeaway foods	—	36	29	22	13
The government should run regular healthy eating and physical activity campaigns in the mass media	—	5	19	37	39
Food labels should highlight the calorie/kJ content of foods	—	5	17	33	46
Children should spend no more than 1 h a day watching TV or playing computer games	—	15	27	29	29

Factor loadings are expressed as whole numbers.

Table 4 Summary of the analysis of variance of the factor scores by sex, parental status and education level for the causes and prevention measures^a

Factors	Sex			Parental status			Education level		
	Male	Female	P	Parents	Nonparents	P	Tertiary	Nontertiary	P
<i>Causes</i>									
1. Parental responsibility	-0.24 (0.94)	-0.18 (1.02)	NS	0.05 (0.94)	-0.02 (1.05)	NS	0.14 (0.95)	-0.18 (1.03)	NS
2. Modern technology and media	-0.22 (1.08)	0.11 (0.95)	*	0.16 (0.95)	-0.17 (1.03)	*	-0.11 (1.04)	0.11 (0.93)	*
3. Overconsumption of food	0.05 (0.90)	-0.05 (1.04)	NS	-0.07 (1.00)	0.08 (1.00)	NS	-0.06 (0.93)	0.09 (1.05)	NS
4. Children's lack of knowledge and motivation	0.08 (0.95)	0.07 (1.00)	NS	-0.03 (1.02)	0.05 (0.98)	NS	-0.02 (0.98)	0.00 (1.03)	NS
5. Government neglect	-0.21 (0.95)	0.12 (1.02)	*	0.21 (0.93)	-0.25 (1.00)	**	-0.12 (1.03)	0.11 (0.95)	NS
6. Lack of healthy food	-0.01 (0.99)	-0.04 (1.00)	NS	0.03 (0.98)	-0.03 (1.03)	NS	-0.02 (0.96)	0.04 (1.05)	NS
7. Lack of physical activity	0.20 (1.01)	-0.10 (0.99)	**	0.14 (0.92)	-0.14 (1.07)	*	0.05 (0.98)	-0.03 (1.03)	NS
<i>Prevention measures</i>									
1. Government action	-0.19 (0.97)	0.06 (0.98)	NS	0.18 (1.01)	-0.20 (0.95)	**	0.01 (1.00)	-0.02 (1.00)	NS
2. Children's health promotion	-0.23 (1.06)	0.11 (0.94)	*	0.07 (1.02)	-0.07 (0.96)	NS	-0.02 (1.06)	0.01 (0.95)	NS

*** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$, NS = not significant. ^aMean (s.d.).

(Table 4). There was, however, a statistically significant interaction between sex and education level for 'children's lack of knowledge and motivation' (factor 4; $F_{7,220} = 5.54$, $P = 0.02$). Nontertiary educated men had higher scores than tertiary educated men (mean = 0.28, s.d. = 0.94 vs mean-

= -0.10, s.d. = 0.94), but nontertiary educated women scored lower than tertiary educated women (mean = -0.19, s.d. = 1.06 vs mean = 0.03, s.d. = 0.94). There was also a statistically significant interaction between sex and education level for 'lack of physical activity' (factor 7: $F_{7,220} = 6.46$,

$P=0.01$). Nontertiary educated men had high scores (mean = 0.42, s.d. = 0.98), while tertiary educated men had low scores (mean = 0.06, s.d. = 1.00). In contrast, nontertiary women had low scores (mean = -0.25, s.d. = 1.03) and tertiary educated women had higher scores (mean = 0.05, s.d. = 0.96).

For the prevention factors, women had higher scores than men on 'children's health promotion' (Table 4). Parents had higher scores than nonparents on the 'government action' factor. There were no statistically significant education differences on the prevention factors; however, there was a statistically significant interaction between sex and education level for 'children's health promotion' (factor 2, $F_{7,253} = 11.28$, $P = 0.001$). Nontertiary educated men had higher scores than tertiary educated men (mean = 0.09, s.d. = 0.83 vs mean = -0.49, s.d. = 1.17). Conversely, tertiary educated women had higher scores than their nontertiary educated peers (mean = 0.25, s.d. = 0.89) vs mean = -0.02, s.d. = 0.98).

Discussion

As far as we are aware, this is the first study that has examined community perceptions of the causes of the obesity epidemic among children and their views regarding preventive approaches. Although based on a convenience sample, the findings are important for health policy makers as they develop and implement strategies in an attempt to reverse the obesity epidemic. They suggest that the public recognises the causes of the epidemic to be multifactorial, with almost all the causes included in the survey viewed as being of at least some importance by a majority of respondents. However, it is noteworthy that many factors in the environment (ie availability of safe walking and cycling paths or other places to be active, availability and price of healthy foods) were not seen as important causes of childhood obesity by a large proportion of respondents. The public's view is therefore at odds with the current thinking that argues that environmental factors are at the root of the epidemic.^{16,17}

While the public appears to have acknowledged that no one factor is responsible for childhood obesity, the media's promotion of unhealthy foods and the overconsumption of fast foods were perceived to be key causative factors, being identified as extremely important by one in two adults. Despite scientific debate regarding the relative importance of energy intake vs energy expenditure,¹⁸ the respondents in this study more often held the view that it is children's eating rather than their physical activity habits that is important. Interestingly, while lack of physical activity was perceived to be an extremely important cause of obesity by only about one in four adults, the sedentary pursuit of TV viewing was rated as extremely important by more than four in ten. This apparent contradiction can be explained by other findings from the present study that suggest that a large proportion of the public recognises that

TV viewing is not just a time when children are inactive. Many respondents also held the view that exposure to advertising of energy-dense products and the consumption of foods in front of the TV are extremely important as causes of obesity.

The widespread consensus in favour of several children's health promotion activities is encouraging for public health activists. It suggests that a relatively straightforward set of initiatives would be supported by the public. It provides an initial, noncontroversial agenda for the prevention of children's obesity. However, the implementation of this agenda, consisting of daily physical education programmes in schools, government campaigns in the mass media, food label changes, etc, requires expenditure by industry, education departments and especially by the government. It also requires a philosophical shift by governments to intervene against factors that influence children's obesity. In the present neo-liberal environment of Australia, this will be difficult to do, although in the past programmes such as the South Australian Daily Physical Education program¹⁹ were supported by the government. We need to examine in detail the reasons for the passing of these early Australian programmes, which did impact on obesity,^{19,20} and their failure to become permanent features of the Australian public health scene. Nevertheless, there is now an opportunity to initiate a series of obesity prevention actions that are likely to be supported by a majority of the public.

The factor analysis of the prevention items suggests that the respondents tended to group together activities that were clearly in the remit of government such as the building of bike paths and the raising of taxes. These were not as popular as the more obvious obesity prevention strategies such as daily physical education programmes or the provision of healthy foods in schools. It may be that the public recognises the need for specific obesity prevention actions, but are less aware of the ways in which such programmes have to be funded and supported by the government. The findings, then, suggest the need for more public debate about the causes and prevention of obesity in Australia. This debate should incorporate more explanation by public health researchers about the importance of issues like large serve sizes of high-energy foods as well as more consideration and demand for increased government involvement in the funding and operation of obesity prevention campaigns and programmes. The findings suggest that many people are concerned about children's obesity and expect the government, among several agencies, to take action.

The demographic differences in the respondents' views of the causes and prevention of children's obesity suggest that close involvement with children's lives (eg that of parents and many women) makes people more aware of the environmental causes of obesity and of the need for assistance from the government and other agencies to combat the problem. More educational activities are required to persuade the less involved of the long-term benefits of obesity prevention for the whole community.

Conclusion

This preliminary study has shown that lay people have a rather sophisticated understanding of the causes of children's obesity. They endorse the view that environmental factors are important causes and they require several types of programmes, especially in the school and in the media, to prevent the problem.

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