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Data Management and Survey Techniques EC515

The impact of child physical activity and caregiver's BMI on child BMI

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Abstract

Health care professionals are deeply concerned about childhood obesity as there has been a steady increase in the number of cases over the past few decades. Through analysis of Growing Up in Ireland survey data from families, children and teachers of over 8568 nine year olds living in Ireland; this paper discusses some of the underlying issues that result in child obesity. It looks at the effect of two possible factors that is, child physical activity as well as caregivers' BMI on the child's BMI. Other variables that affect or are directly or indirectly related to the key variables are also analysed in order to find a basis for drawing conclusions and providing solutions through possible policy implications. Limitations on the study are also outlined as well as further areas for research.

Contents

Introduction

Obesity can be defined as the health condition in which excess body fat has accumulated to such an extent that health may be adversely affected (World Health Organisation, 2000). Excess weight in childhood can have serious health consequences both in childhood and later life. A study conducted by Willis et al. (2013) indicated that over 50 per cent of adults in Britain will be obese by 2050 if current trends continue. Unfortunately, most of these cases will be a result of childhood obesity which could eventually lead to cardiovascular disease later in life. According to the Irish Heart Foundation, cardiovascular disease accounts for 6 per cent of the Irish healthcare budget which is significantly lower than the EU average of 10 per cent. Although, this figure is low policies should be implemented to prevent these figures from rising.

At present, one in four children in Ireland is overweight or obese. A strong variable that influences childhood obesity is parental obesity. This is a huge risk factor as an overweight parent doubles the risk of child obesity. An important determinant of parental BMI is Socio-economic status (SES) which affects the shared family environment. There is a correlation between obesity and SES. Lifestyle choices, behaviours, areas of residence and food affordability are all variables that are correlated with obesity. The inverse relationship between obesity and SES is well defined. In other words, when SES falls obesity rises (Knai et al., 2012).

This study seeks to analyse the impact of physical activity and caregiver's BMI on the child's BMI. Other factors which may have an impact on the caregiver's BMI and level of physical activity are also considered. These include the families Socio-Economic Status, environment, presence of play area, activities such as playing sports, swimming, and so on. One of the discussions I would like to add to our report is the parent's opinion on the study child's body image and how this may affect the study child's BMI.

Methods

The main concern of this study was to establish whether there is a relationship between children's BMI and both their level of physical activity and caregivers' BMI status. The study was conducted using data from the Growing Up in Ireland survey of families, children and teachers of over 8568 nine year olds living in Ireland. The data was collected targeting families and children in 900 schools in Ireland between 2007 and 2008, in order to provide a detailed characterisation of children's lives in Ireland with the objective of informing public policy.

The study was conducted through data analysis by use of descriptive statistics. This analysis was completed using SPSS Statistics 20.0.0. The first step of the process was to study all the data in order to identify variables of study interest and any missing data which might have a significant impact on the study. The data was found sufficient and good to work with. Any few missing variables are eliminated from the reported results. The key variables of study interest identified were child physical activity, caregiver's BMI and child BMI.

During this initial data analysis, it was observed that the child measured BMI variable was not part of the data and I created it by using the study child's measured weight and height in meters. The data relating to the child's measured height is in centimetres, and it was converted to meters and then meters squared in order to calculate the BMI. The following formula was used;

$$\text{BMI} = \frac{Mass\ in\ kilograms}{Height\ in\ square\ meters}.$$

Categorisation of child BMI was then done basing on International Obesity Taskforce definitions. Children were classified as normal weight, overweight (a body mass index [BMI] of 19.46 for boys and 19.45 for girls) or obese (a BMI of 23.39 for boys and 23.46 for girls) using age and gender specific International Obesity Taskforce (IOTF) cut off points.

Data for the independent variables, that is, Child physical activity and caregiver's BMI was available in the data set. Other variables related to the study question included the following; Number of times the study child was engaged in hard exercises in last 14 days; Number of times the study child was engaged in light exercises in last 14 days; How the study child goes to school; Whether it is safe for children to play outside during the day; Whether there are safe parks, playgrounds, and play spaces in the child's home area; The best thing to do during free time being sport; How often study child played sport; How often the study child takes exercise; Whether there was a play ground near home; primary caregiver's level of education qualification; how often the primary caregiver tried to lose weight and opinion of study child's body image among others.

The above variables were compared in relation to study child's BMI and in order to assess whether there were relationships. Implications of such relationships were discussed and conclusion on the way forward was drawn. The results were presented in form of graphs, tables and pie charts.

Results and Discussion

Key Variables

Variable	Variable Description
BMI	BMI calculated using measured weight in kilograms and height in squaremeters
Child BMI Classification	1 = Normal 2 = Overweight 3 = Obese
Caregivers' BMI Classification	1 = Underweight 2 = Normal 3 = Overweight 4 = Obese
Primary caregivers highest level of education attainment	1 = None or primary 2 = Lower sec 3 = Hi Sec/TechVoc/UppSec+Tech/Voc 4 = Non Degree 5 = Primary 6 = Postgrad
How study child goes to school	1 = He/she walks 2 = By public transport 3 = School bus/coach 4 = By car 5 = Rides a bicycle 6 = Other
Opinion of study child's body image	1 = Very underweight 2 = Very/Moderately Underweight 3 = Slightly underweight 4 = About the right weight 5 = Slightly overweight 6 = Moderately overweight 7 = Very/Moderately Overweight

Summary Statistics

Variable Name	N	Min.	Max.	Mean	Standard Deviation
Child BMI derived from measured data	8136	9.46	37.07	17.84	2.971
Primary caregiver BMI derived from measured data	7823	16.07	48.91	25.99	4.755
Secondary caregiver BMI derived from measured data	6761	17.24	48.65	27.88	3.871
Primary caregivers highest level of education attainment	8568	1	6	3.6	1.275

Child BMI

Generally, it was observed that 75.2% of children in Ireland were found to be of normal weight, 19.0% were overweight while 5.8% were obese. Girls were found to have higher percentages of overweight and obesity at 21.1% and 6.7% respectively compared to the boys at 16.7% and 5.0% respectively. Refer to appendix I.
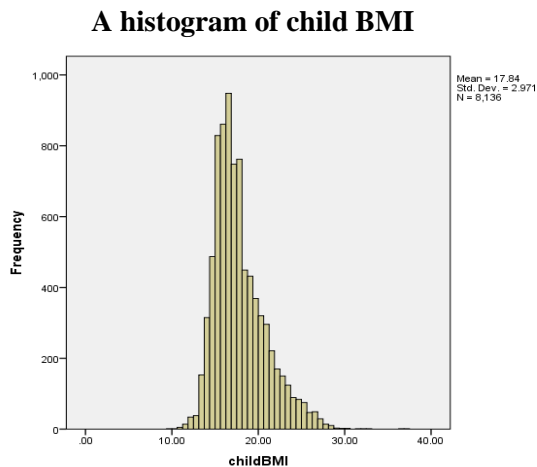
A histogram of child BMI

Mean = 17.84
Std. Dev. = 2.971
N = 8,136

Table 1: Descriptive statistics for Child BMI

CHLDBMICLSS				
		Freque ncy	Valid Percent	Cumulative Percent
Valid	Normal	6120	75.2	75.2
	Over weight	1542	19.0	94.2
	obese	474	5.8	100.0
	Total	8136	100.0	

Relationship between child BMI and Caregiver's BMI?

Generally, the mean BMI for children was 17.84. The child BMI was also analysed across the caregiver's (both primary and secondary caregiver) BMI classification groups and it was noted that value of the child BMI was increasing across the different caregiver BMI classifications. The average child BMI was 16.47, 17.89 and 19.82 across normal, overweight and obese caregivers respectively. See tables 2, 3 and 4 below.

Table 2: Descriptive Statistics for child BMI under the normal weight caregiver category (both parents normal weight)

	N	Minimum	Maximum	Mean	Std. Deviation
childBMI	817	10.71	27.83	16.4743	2.24608
Valid N (listwise)	817				

Table 3: Descriptive Statistics for child BMI under the overweight caregiver category (both parents are overweight)

	N	Minimum	Maximum	Mean	Std. Deviation
childBMI	1082	11.52	32.71	17.8886	2.79224
Valid N (listwise)	1082				

Table 4: Descriptive Statistics for child BMI under the obese caregiver BMI classification (both parents are obese)

	N	Minimum	Maximum	Mean	Std. Deviation
childBMI	416	12.24	37.07	19.8179	3.54540
Valid N (listwise)	416				

The mean child BMI was also analysed under primary caregivers' BMI classification and secondary caregivers' BMI classification seperately and it was observed that primary caregivers had a greater influence on child BMI than secondary caregivers. The mean child BMI under secondary caregiver BMI classification of normal weight, overweight and obese was 16.95, 17.64 and 18.72 respectively. This was found to be lower compared to the mean child BMI under primary caregiver BMI classification at 17.17, 18.11 and 19.12 for normal weight, overweight and obese respectively. Refer to Appendix II.

This was the case even when it was noted that there were more overweight and obese secondary caregivers at 51.5% and 25.9% respectively than primary caregivers at 32.5% and 17.8% respectively. Refer to Appendix III.

An analysis of variance (ANOVA) test was done to determine if the difference in average child BMI was indeed as a result of the effect of caregiver's BMI classification on child BMI and not due to sample error or chance. It was noted that the difference in the mean child BMI across the primary caregiver's BMI classification was statistically significant and as such parental BMI affects the child BMI. The difference in the BMI was not due to sample error or chance. Refer to Appendix IV: ANOVA tests.

There was a positive correlation between the parental BMI classification and child BMI. This correlation was statistically significant at the 1% level for a two tailedtest. It was noted that the correlation was stronger for primary caregivers than for secondary caregivers. Refer to Appendix V: Correlation tables.

Since caregiver BMI has an impact on child BMI, it was considered important to analyse some of the factors that have an impact on parental BMI. This is especially important in order to address the root cause of the problem of increasing unfavourable BMI.

Analysis of primary caregivers' level of education and primary caregivers' BMI

The mean primary caregivers BMI across the different levels of education attainment was 27.93, 26.94, 26.14, 25.88, 25.26 and 24.95 across None or primary, Lower sec, Hi Sec/TechVoc/UppSec+Tech/Voc, None degree, Primary and Postgrad respectively. A one way ANOVA test revealed that the difference in the means is statistically significant and not just a result of sample error. Thus parents with lower level of education attainment were found to have higher levels of BMI. Refer to Appendix IV (ANOVA test) and VI (means) .

Opinion of study child's body image

Children with a BMI classification of obese and overweight were then considered to find out their parents' view of their body image. It was discovered that 48.8% of parents with overweight and obese children thought that the study child was very underweight, slightly underweight or just about the right weight yet in the actual sense the child was either overweight or obese. This is a big percentage, almost half of the parents of obese children. See table below.

Table 5: Opinion of study child's body image

		Frequency	Valid Percent	Cumulative Percent
Valid	Very/Moderately Underweight	9	.4	.4
	Slightly underweight	26	1.3	1.7
	About the right weight	950	47.1	48.9
	Slightly overweight	885	43.9	92.8
	Very/Moderately Overweight	146	7.2	100.0
	Total	2016	100.0	

How often the primary caregiver tried to lose weight.

It was observed that the average BMI was highest for primary caregivers who tried to lose weight very often, at 29.67, followed by 28.83, 27.33, 25.78, and 23.78 for Often, sometimes, rarely and never respectively. Also, it was observed that overweight and obese caregivers who tried to lose weight very often represented 81.3%, followed by 77.3%, 66%, 49.9% and 28% in the often, sometimes, rarely and never category. Refer to Appendix VII. The more the frequency of losing weight, the higher the percentage noted of obese and overweight caregivers trying to lose weight. Perhaps this is explained by the fact that they realise they are not of good

BMI and thus try to lose weight more. This needs to be investigated further. Since parental BMI is positively correlated with child BMI, there is a possible solution to the child overweight and obesity problem in dealing with parental BMI.

Child's physical activity

Is there a playground nearby?

There were slightly higher percentages of obese and overweight children in areas which lacked a nearby playground than in areas where the playground was nearby at 6.0%, 19.0% and 5.7, 18.7% respectively. In other words, 55.7% of obese children came from areas which lacked a nearby playground while 44.3% of obese and overweight children where from an area with a nearby playground. Possible implication is closeness of playground influenced the likelihood of children to engage in playing activities which would make them healthier than when there was no playground nearby. However, an ANOVA test revealed that the difference in BMI as a result of having a playground nearby was not statistically significant which implies that presence of a playground near a study child's home did not have a strong relationship on the child BMI as anticipated.

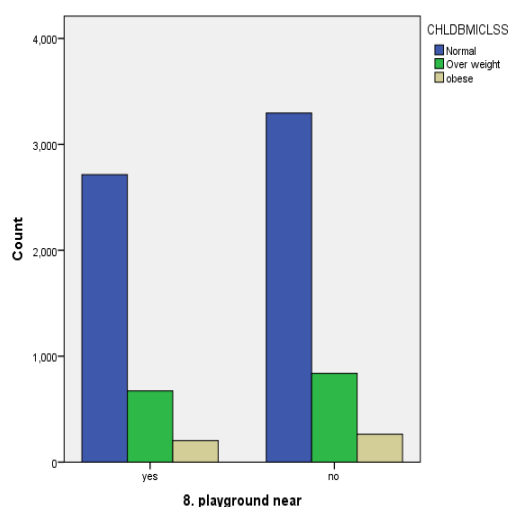**Histogram showing whether there is a nearby playground**

Table 6: Descriptive statistics of overweight and obese children and whether there is a playground nearby.

Overweight and obese children: playground near		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	875	43.4	44.3	44.3
	no	1100	54.6	55.7	100.0
	Total	1975	98.0	100.0	

Table 7: Child BMI and whether there is a nearby playground

8. playground near			Frequency	Valid Percent	Cumulative Percent
yes	Valid	Normal	2714	75.6	75.6
		Over weight	672	18.7	94.3
		obese	203	5.7	100.0
		Total	3589	100.0	
No	Valid	Normal	3295	75.0	75.0
		Over weight	837	19.0	94.0
		obese	263	6.0	100.0
		Total	4395	100.0	

Are there safe places to play?

It was noted that safe places to play were least in areas with obese children at 72.6, followed by 77.7% for overweight children and most for normal weight children at 79%. Lack of safe places was reported the most in obese children's neighbourhoods at 27.4% followed by 22.3% and 21% for overweight and normal weight respectively. Performance of a one way ANOVA test revealed that these differences were statistically significant.

CHLDBMICLSS			Frequency	Valid Percent	Cumulative Percent
Normal	Valid	yes	4742	79.0	79.0
		no	1262	21.0	100.0
		Total	6004	100.0	
	Total		6120		
Over weight	Valid	yes	1169	77.7	77.7
		no	336	22.3	100.0
		Total	1505	100.0	
Obese	Valid	yes	336	72.6	72.6

| | | no | 127 | 27.4 | 100.0 |
| | | Total | 463 | 100.0 | |

How often the study child takes exercise.

It was observed that obese children had the smallest percentage of children who exercised every day and the greatest percentage of children who never exercised at 48.2% and 3.4% respectively, followed by overweight children at 53.5% for those who exercised daily and 0.7% for those who never did. Normal BMI children had the highest percentage of children exercising every day at 57%. It was noted that the more the frequency of exercise, the better the child BMI was.

Further analysis of physical activity including going swimming, playing games outside, and playing sport indicated the following; It was observed that 26.7%, 26.2% and 24.7% of Normal, overweight and obese children respectively had previously gone swimming. 50.2%, 47% and 44% of normal, overweight and obese children respectively indicated that they played games outside, while 44.9%, 41% and 36.5% of normal, overweight and obese children respectively indicated that they played sport every day. When asked whether playing sport was their best thing to do during free time, 30.6%, 25.4% and 23% of normal, overweight and obese children responded that indeed it was. Refer to appendix VIII.

From the above analysis, it is very clear that the percentages are highest or best for children with normal BMI and they reduce or get worse with overweight children and are least or worst when it comes to obese children. It was noted that the less the level of physical activity, the worse the child BMI.

This does not improve when the way the study child goes to school was analysed. Only 24.9% went to school by walking or bicycle. The majority (75.1%) went to school either by car, school bus, public transport and other. This shows that there is less exercise in form of walking as the child goes to school. Refer to appendix IX

Table 14: Child BMI classification and how often they exercised.

CHLDBMICLSS			Frequency	Valid Percent	Cumulative Percent
Normal	Valid	Never	45	.7	.7
		1-2 times a week	1111	18.2	18.9
		3-4 times a week	1465	24.0	43.0
		Almost every day	3481	57.0	100.0
		Total	6102	100.0	
Over weight	Valid	Never	10	.7	.7
		1-2 times a week	325	21.2	21.8
		3-4 times a week	379	24.7	46.5

		Almost every day	821	53.5	100.0
		Total	1535	100.0	
obese	Valid	Never	16	3.4	3.4
		1-2 times a week	103	21.8	25.2
		3-4 times a week	126	26.6	51.8
		Almost every day	228	48.2	100.0
		Total	473	100.0	

Conclusion

One of the main findings was that there is positive correlation between the caregiver's BMI and the study child's BMI. As the parent's BMI increases so does the study child's BMI. To tackle this issue parents need more information on how to counteract this growing problem. Another finding was that almost half of parents (48.8%) did not think their child was overweight or obese when the opposite is true. This is a very worrying trend which I believe comes from a lack of proper understanding and education about obesity. This is a possible area for further research.

From the analysis I have also discovered that caregivers with less education are more likely to be overweight. This gives further rise for the need to promote this topic on a national scale. Better marketing and the need for awareness is needed to educate parents about the dangers of obesity. An example of this would be to copy the Road Safety Authorities campaign. This campaign reduced the number of road deaths in Ireland significantly. A similar campaign on childhood obesity would most certainly raise awareness and prevent the figures from rising. The initiative could focus on increase sensitisation about obesity and promote a healthy lifestyle, for example, exercise programmes among other things. Educating caregivers that their own BMI has an effect on that of the child would also be key in this campaign. A community based initiative to tackle childhood obesity may lead to positive outcomes in later life.

Another finding from this study was that in areas where there were no safe places to play, there were significant higher percentages of obese and overweight children than in areas where there were safe places to play. Also, children with normal BMI were found to have higher percentages of children who exercised most often than the overweight and least numbers found in obese children. Also, obese children had the highest percentage of children who never exercised at all. This is a very worrying finding as children not only need to exercise but also to learn social skills from an early age. Therefore, a government policy could be implemented to increase safety in home environments and school where children can feel safe to play and

this could result in better BMI rather than perhaps staying indoors to play video games or watch TV.

According to Anderson and Butcher (2006) childhood obesity began to rise in the 1980's. One of the main findings in their study was that fewer children were walking or cycling to school opposed to the 1970's. This was the case in this study with 24.9% of children going to school by walking or cycling. The majority (75.1%) went by bus, car, public transport or other ways. Although, there have been many environmental changes that have contributed to reducing children's activity levels government intervention is required to curb against this trend. There could be increased awareness of this by use of health commercials encouraging parents to let children walk to school if nearby, to the store, and other places rather than taking them there by car.

The World Health Organisation has described obesity as global epidemic. Of the Irish population 39 per cent are overweight and 18 per cent are obese. The Health Service Executive estimates there are 2,000 premature deaths annually attributed to obesity at an estimated cost of €4 billion to the state in economic terms. The most obvious place to promote exercise for children is in schools. For example, a restructuring of the school day if necessary to give children more access to physical activities by qualified staff.

This research does not identify all possible causes of obesity in children. There are others like genetics, eating habits, medical conditions, sleep and so on, which were not analysed. These are potential areas for future research in order to help tackle the child overweight and obesity problem.

Appendices

Appendix I: Descriptive statistics for Child BMI according to gender classification

Gender P2			Frequency	Valid Percent	Cumulative Percent
male	Valid	Normal	3101	78.3	78.3
		Over weight	661	16.7	95.0
		obese	196	5.0	100.0
		Total	3958	100.0	
	Total		4164		
female	Valid	Normal	3019	72.3	72.3
		Over weight	881	21.1	93.3
		obese	278	6.7	100.0
		Total	4178	100.0	
	Total		4404		

Appendix II:

Descriptive Statistics for child BMI under normal weight secondary caregivers

	N	Minimum	Maximum	Mean	Std. Deviation
childBMI	1509	10.71	36.28	16.9513	2.65829
Valid N (listwise)	1509				

Descriptive Statistics for child BMI under normal weight primary caregivers

	N	Minimum	Maximum	Mean	Std. Deviation
childBMI	3759	10.61	32.25	17.1688	2.52220
Valid N (listwise)	3759				

Descriptive Statistics for child BMI under over weight secondary caregivers

	N	Minimum	Maximum	Mean	Std. Deviation
childBMI	3434	10.91	32.71	17.6374	2.73390
Valid N (listwise)	3434				

Descriptive Statistics for child BMI under over weight primary caregivers

	N	Minimum	Maximum	Mean	Std. Deviation
childBMI	2508	11.35	32.71	18.1133	2.99989
Valid N (listwise)	2508				

Descriptive Statistics for child BMI under obese secondary caregivers

	N	Minimum	Maximum	Mean	Std. Deviation

	N	Minimum	Maximum	Mean	Std. Deviation
childBMI	1711	12.08	37.07	18.7249	3.13525
Valid N (listwise)	1711				

Descriptive Statistics for child BMI under obese primary caregivers

	N	Minimum	Maximum	Mean	Std. Deviation
childBMI	1357	11.70	37.07	19.1199	3.41753
Valid N (listwise)	1357				

Appendix III

Secondary caregivers BMI classification derived from measured data

		Frequency	Valid Percent	Cumulative Percent
Valid	underweight	5	.1	.1
	healthy	1527	22.6	22.7
	overweight	3481	51.5	74.1
	obese	1748	25.9	100.0
	Total	6761	100.0	

Primary caregivers BMI classification derived from measured data

		Frequency	Valid Percent	Cumulative Percent
Valid	underweight	79	1.0	1.0
	healthy	3809	48.7	49.7
	overweight	2545	32.5	82.2
	obese	1390	17.8	100.0
	Total	7823	100.0	

Appendix IV: ANOVA tests

ANOVA tests for Child BMI across primary caregiver BMI classification

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4218.508	3	1406.169	172.100	.000
Within Groups	62889.630	7697	8.171		
Total	67108.138	7700			

ANOVA Analysis of Primary Caregiver's BMI across education levels

ANOVA Primary Caregiver's BMI - derived from measured data					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3568.187	5	713.637	32.195	.000
Within Groups	173272.846	7817	22.166		
Total	176841.033	7822			

ANOVA test of primary caregiver BMI and how often primary caregiver tried to lose weight

	Sum of Squares	DF	Mean Square	F	Sig
Between groups	5664.347	1468	3.859	2.628	.000
Within Groups	9328.790	6353	1.468		
Total	14993.137	7821			

ANOVA test of child BMI class and whether there is a playground nearby

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.188	1	.188	.572	.449
Within Groups	2626.509	7982	.329		
Total	2626.697	7983			

ANOVA test of child BMI class and whether there is a safe place to play.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.028	1	3.028	9.236	.002
Within Groups	2612.658	7970	.328		
Total	2615.685	7971			

Appendix V: Correlation tables

Correlations between secondary caregivers' BMI classification and Child BMI

	childBMI	Secondary Caregiver's BMI classification - derived from measured data

		childBMI	Secondary Caregiver's BMI classification - derived from measured data
childBMI	Pearson Correlation	1	.214**
	Sig. (2-tailed)		.000
	N	8136	6658
Secondary Caregiver's BMI classification - derived from measured data	Pearson Correlation	.214**	1
	Sig. (2-tailed)	.000	
	N	6658	6761

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations between primary caregivers' BMI classification and Child BMI

		childBMI	Primary Caregiver's BMI classification- derived from measured data
childBMI	Pearson Correlation	1	.250**
	Sig. (2-tailed)		.000
	N	8136	7701
Primary Caregiver's BMI classification- derived from measured data	Pearson Correlation	.250**	1
	Sig. (2-tailed)	.000	
	N	7701	7823

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix VI: Mean primary caregiver BMI across different education levels.

Descriptive Statistics

L37 What is the highest level of education you have completed to date		N	Minimum	Maximum	Mean	Std. Deviation
NOne or primary	Primary Caregiver's BMI - derived from measured data	261	16.85	46.38	27.9301	5.80136
	Valid N (listwise)	261				
Lower Sec	Primary Caregiver's BMI - derived from measured data	1114	16.14	47.65	26.9419	5.30482
	Valid N (listwise)	1114				
Hi Sec/TechVoc/UppSec+Tech/Voc	Primary Caregiver's BMI - derived from measured data	2481	16.07	48.91	26.1395	4.81730

		N	Minimum	Maximum	Mean	Std. Deviation
	Valid N (listwise)	2481				
Non Degree	Primary Caregiver's BMI - derived from measured data	1953	17.30	45.45	25.8868	4.53604
	Valid N (listwise)	1953				
Primary	Primary Caregiver's BMI - derived from measured data	1253	16.42	46.75	25.2579	4.29044
	Valid N (listwise)	1253				
Postgrad	Primary Caregiver's BMI - derived from measured data	761	17.69	44.14	24.9465	4.04563
	Valid N (listwise)	761				

Appendix VII: Mean BMI and how often the primary caregiver tried to lose weight

F8. How often do you try to lose weight		N	Minimum	Maximum	Mean	Std. Deviation
Very often	Primary Caregiver's BMI - derived from measured data	804	19.33	44.85	29.6707	5.25532
	Valid N (listwise)	804				
Often	Primary Caregiver's BMI - derived from measured data	877	19.29	48.91	28.8349	4.79164
	Valid N (listwise)	877				
Sometimes	Primary Caregiver's BMI - derived from measured data	1669	16.42	47.65	27.3318	4.46199
	Valid N (listwise)	1669				
Rarely	Primary Caregiver's BMI - derived from measured data	1110	17.21	44.86	25.7823	4.06279
	Valid N (listwise)	1110				
Never	Primary Caregiver's BMI - derived from measured data	3362	16.07	46.38	23.7775	3.68082
	Valid N (listwise)	3362				

How often primary caregiver tried to lose weight given their BMI classification

F8. How often do you try to lose weight			Frequency	Valid Percent	Cumulative Percent
Very often	Valid	healthy	150	18.7	18.7
		overweight	324	40.3	59.0
		obese	330	41.0	100.0
		Total	804	100.0	

			Frequency	Percent	Valid Percent	Cumulative Percent
Often	Valid	healthy	199	22.7		22.7
		overweight	378	43.1		65.8
		obese	300	34.2		100.0
		Total	877	100.0		
Sometimes	Valid	underweight	7	.4		.4
		healthy	560	33.6		34.0
		overweight	704	42.2		76.2
		obese	398	23.8		100.0
		Total	1669	100.0		
Rarely	Valid	underweight	4	.4		.4
		healthy	552	49.7		50.1
		overweight	401	36.1		86.2
		obese	153	13.8		100.0
		Total	1110	100.0		
Never	Valid	underweight	68	2.0		2.0
		healthy	2348	69.8		71.9
		overweight	737	21.9		93.8
		obese	209	6.2		100.0
		Total	3362	100.0		

Appendix VIII: Level of physical activity

Q7af. Gone swimming						
CHLDBMICLSS			Frequency	Percent	Valid Percent	Cumulative Percent
Normal	Valid	yes	1628	26.6	26.7	26.7
		no	4474	73.1	73.3	100.0
		Total	6102	99.7	100.0	
	Missing	System	18	.3		
	Total		6120	100.0		
Over weight	Valid	yes	402	26.1	26.2	26.2
		no	1133	73.5	73.8	100.0
		Total	1535	99.5	100.0	
	Missing	Don't know	2	.1		
		System	5	.3		
		Total	7	.5		
	Total		1542	100.0		
obese	Valid	yes	117	24.7	24.7	24.7
		no	357	75.3	75.3	100.0
		Total	474	100.0	100.0	
Q7ah. Played games outside						
CHLDBMICLSS			Frequency	Percent	Valid Percent	Cumulative Percent
Normal	Valid	yes	3060	50.0	50.2	50.2
		no	3041	49.7	49.8	100.0
		Total	6101	99.7	100.0	

			Frequency	Percent	Valid Percent	Cumulative Percent
	Missing	Dontknow	1	.0		
		System	18	.3		
		Total	19	.3		
	Total		6120	100.0		
Over weight	Valid	yes	721	46.8	47.0	47.0
		no	814	52.8	53.0	100.0
		Total	1535	99.5	100.0	
	Missing	Dontknow	2	.1		
		System	5	.3		
		Total	7	.5		
	Total		1542	100.0		
obese	Valid	yes	208	43.9	44.0	44.0
		no	265	55.9	56.0	100.0
		Total	473	99.8	100.0	
	Missing	Dontknow	1	.2		
	Total		474	100.0		

Q12c. Playing sport

CHLDBMICLSS			Frequency	Percent	Valid Percent
Normal	Valid	Best thing to do in free time	1870	30.6	49.2
		Second best thing to do in free time	1241	20.3	32.6
		Third best thing to do in free time	692	11.3	18.2
		Total	3803	62.1	100.0
	Missing	System	2317	37.9	
	Total		6120	100.0	
Over weight	Valid	Best thing to do in free time	391	25.4	44.9
		Second best thing to do in free time	315	20.4	36.2
		Third best thing to do in free time	165	10.7	18.9
		Total	871	56.5	100.0
	Missing	System	671	43.5	
	Total		1542	100.0	
obese	Valid	Best thing to do in free time	109	23.0	42.4
		Second best thing to do in free time	87	18.4	33.9
		Third best thing to do in free time	61	12.9	23.7
		Total	257	54.2	100.0
	Missing	System	217	45.8	
	Total		474	100.0	

Q14. How often Study Child plays sport

CHLDBMICLSS			Frequency	Percent	Valid Percent	Cumulative Percent
Normal	Valid	Never	134	2.2	2.2	2.2
		1-2 times a week	1757	28.7	28.8	31.0
		3-4 times a week	1468	24.0	24.1	55.1
		Almost every day	2742	44.8	44.9	100.0
		Total	6101	99.7	100.0	
	Missing	System	18	.3		

		Dontknow	1	.0		
		Total	19	.3		
	Total		6120	100.0		
Over weight	Valid	Never	33	2.1	2.1	2.1
		1-2 times a week	526	34.1	34.2	36.4
		3-4 times a week	348	22.6	22.6	59.0
		Almost every day	630	40.9	41.0	100.0
		Total	1537	99.7	100.0	
	Missing	System	5	.3		
	Total		1542	100.0		
obese	Valid	Never	15	3.2	3.2	3.2
		1-2 times a week	172	36.3	36.3	39.5
		3-4 times a week	114	24.1	24.1	63.5
		Almost every day	173	36.5	36.5	100.0
		Total	474	100.0	100.0	

Appendix IX: How study child goes to school.

How Study Child goes to school		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	He/she walks	2024	23.6	23.6	23.6
	By public transport	66	.8	.8	24.4
	School bus/coach	1025	12.0	12.0	36.4
	By car	5278	61.6	61.6	98.0
	Rides a bicycle	109	1.3	1.3	99.2
	Other	66	.8	.8	100.0
	Total	8568	100.0	100.0	

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