

Regional differences in Childhood BMI data - The Malta Childhood National Body Mass Index Study

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Abstract

Introduction: Obesity is a problem of major public health concern all over the world and Malta has high obesity prevalence rates. With over a third of Maltese children being overweight or obese, the Malta Childhood National Body Mass Index study was devised to quantify the extent of the problem precisely. This paper looks at regional differences in the BMI data obtained.

Methods: Training in measurement was provided to physical education teachers and identical stadiometers were used. Data was processed using World Health Organisation cut-offs for underweight, overweight and obesity.

Results: A total of 41,343 students from 145 schools were measured. Age range from 4.7 to 17 years. Approximately 40% of school-aged children in Malta were overweight or obese, with higher percentages of obesity than overweight being observed. Results show significant differences in BMI between children living in Northern and Southern regions of Malta.

Conclusion: Results from this study further confirm the high levels of overweight and obesity in Maltese children. The North-South differences should help better target public health resources and should be further evaluated in more focussed research.

Keywords

child, health, nutrition, obesity, region, Malta

Introduction

The world has seen the prevalence of obesity increasing year on year reaching epidemic levels in many countries.¹ For this reason, Public Health entities have put obesity on the forefront of their agenda. Particular focus is being given to childhood obesity. It is well known that overweight children become overweight adults and therefore tackling the problem from an early stage may be helpful in reducing the prevalence of obesity and its detrimental effects on health.²

In 2015, a national study was carried to measure the body mass index (BMI) of all children attending school in Malta thereby covering ages 5 to 15. This study was unique since all children were included for measurement rather than just a sample.⁶

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Schools in Malta are run by three main groups: 1) State schools are free and government-led; 2) Church schools are partly subsidized and run by the Roman Catholic Church; and 3) Independent schools are a mixture of schools privately run by different organizations against a set fee. Primary schools usually cater for children from 5 till 10 and secondary schools cater for students from 11 to 16 approximately.

Part of the data collected from the Malta Childhood National BMI study (2015-16) included the locality of residence of the child⁶. The purpose of this study was to describe the geographical distribution of prevalence of childhood overweight and obesity in Malta.

Method

Ethics

Ethical approval for the Malta National Childhood BMI study was obtained from the Ethics Committee of the Malta Education Division and the Malta University Research Ethics Committee. The Malta National Commissioner for Data Protection also endorsed this project. Permissions were also obtained separately from the Central Church schools authorities and from the Independent schools.

Data Collection

Data was collected using identical scale-stadiometers (GIMA 27288 PEGASO DIGITAL SCALE) in all schools. Measurements were carried out by the Physical Education teachers in each respective school or college. Teachers were shown how to measure height accurately and a reminder handout was attached to each weighing scale. Teachers were also responsible for data inputting into standardized and bespoke spreadsheet⁷. Physiotherapists coordinated by the Malta Association of Physiotherapists and other administrative staff also helped with data collection.

Current World Health Organisation (WHO) BMI cut-offs were used. Key values were overweight (between WHO 85-95 percentiles), obese (greater than WHO 95th percentile), and underweight (less than the 5th percentile).⁸

Students' BMI data was grouped according to geographical locality and region of birth. The

Maltese islands are divided into six regions by Malta's National Statistics Office: North, Northern Harbour, Southern Harbour, South East, West, and Gozo & Comino.

Results

This study included 145 schools – 39 Church, 94 State and 12 Independent schools, some of which have primary and/or secondary components, and some of which are coeducational and while others are not. Data was available for 41,343 students – 21,147 males and 20,196 females – ranging in age from 4.7-17years.

Summary statistics and number of children overweight, obese and underweight, by gender for primary and secondary schools by region, are shown in table 1. Table 2 displays percentages for the same data for overweight, obese and underweight. Figures 1 and 2 display ranked body mass index mean (and 95% confidence intervals) by region for primary and secondary schools respectively.

After ranking, chi test for trend for overweight and obesity by region showed highly significant trends for male primary (chi for trend=38.7, $p<0.0001$), male secondary (chi for trend=11.0, $p=0.001$), females primary (chi for trend=30.6, $p<0.0001$) and females secondary schools (chi for trend=30.6, $p<0.0001$).

Discussion

This analysis shows significant differences in BMI between children living in the North and those living in the South parts of the island, despite the small size of the country at just 316km². This disparity has been shown in previous studies but a study in 2011 seemed to suggest that this trend was fading.⁹ However, the trend is clearly still significantly present. Data from the Maltese National Statistics Office provide a picture of a wealthier North when compared to a less prosperous South.¹⁰⁻¹¹ For example, on average, persons living in the North were also found to live in larger residences, have better literacy levels, have a higher chance of owning their home (rather than renting) and have lower levels of unemployment when compared to the South.¹⁰⁻¹¹

Table 1: Summary statistics and number of children overweight, obese and underweight, by gender for primary and secondary schools by region

	North	North Harbour	South Harbour	South Eastern	Western	Gozo and Comino
Males Primary						
N	1964	3405	2081	1972	1670	739
Mean	17.8	17.8	18.4	18.2	18.0	18.2
Standard error	0.1	0.1	0.1	0.1	0.1	0.1
Standard deviation	3.5	3.5	3.8	3.8	3.6	3.6
Overweight & obese (≥ P85%)	763	1347	971	858	669	328
Obese (≥ P95%)	493	833	677	577	445	222
Overweight (P85-95%)	270	514	294	281	224	106
Underweight (%)	49	73	51	40	34	4
Females Primary						
N	1891	3046	1948	1840	1551	855
Mean	17.6	17.7	18.3	18.1	17.8	18.1
Standard error	0.1	0.1	0.1	0.1	0.1	0.1
Standard deviation	3.3	3.5	3.9	3.8	3.6	3.6
Total Measured	1891	3046	1948	1840	1551	855
Overweight & obese (≥ P85%)	660	1050	798	725	544	337
Obese (≥ P95%)	377	633	515	448	319	215
Overweight (P85-95%)	283	417	283	277	225	122
Underweight (%)	32	71	38	22	29	3
Males Secondary						
N	1533	2428	1695	1552	1391	717
Mean	21.9	21.8	22.2	22.4	22.0	22.4
Standard error	0.1	0.1	0.1	0.1	0.1	0.2
Standard deviation	4.9	4.9	5.1	5.2	5.1	5.8
Overweight & obese (≥ P85%)	672	1068	782	739	586	322
Obese (≥ P95%)	444	709	544	508	400	230
Overweight (P85-95%)	228	359	238	231	186	92
Underweight (%)	45	85	50	36	40	30
Females Secondary						
N	1564	2368	1555	1494	1361	723
Mean	22.1	21.9	22.7	22.8	22.3	22.3
Standard error	0.1	0.1	0.1	0.1	0.1	0.2
Standard deviation	4.6	4.6	5.3	5.1	5.0	4.9
Overweight & obese (≥ P85%)	610	892	694	671	563	280
Obese (≥ P95%)	344	494	433	407	327	165
Overweight (P85-95%)	266	398	261	264	236	115
Underweight (%)	27	68	30	33	27	19

Table 2: Percentage of children overweight, obese and underweight, by gender for primary and secondary schools by region (as per table 1).

	Northern	Northern Harbour	Southern Harbour	South Eastern	Western	Gozo and Comino
Males Primary						
Normal weight	58.7	58.3	50.9	54.5	57.9	55.1
Obese	25.1	24.5	32.5	29.3	26.6	30.0
Overweight	13.7	15.1	14.1	14.2	13.4	14.3
Underweight	2.5	2.1	2.5	2.0	2.0	0.5
Males Secondary						
Normal weight	53.2	52.5	50.9	50.1	55.0	50.9
Obese	29.0	29.2	32.1	32.7	28.8	32.1
Overweight	14.9	14.8	14.0	14.9	13.4	12.8
Underweight	2.9	3.5	2.9	2.3	2.9	4.2
Females Primary						
Normal weight	63.4	63.2	57.1	59.4	63.1	60.2
Obese	19.9	20.8	26.4	24.3	20.6	25.1
Overweight	15.0	13.7	14.5	15.1	14.5	14.3
Underweight	1.7	2.3	2.0	1.2	1.9	0.4
Females Secondary						
Normal weight	59.3	59.5	53.4	52.9	56.6	58.6
Obese	22.0	20.9	27.8	27.2	24.0	22.8
Overweight	17.0	16.8	16.8	17.7	17.3	15.9
Underweight	1.7	2.9	1.9	2.2	2.0	2.6

Figure 1: Ranked body mass index mean (and 95% confidence intervals) by region for primary school males and females

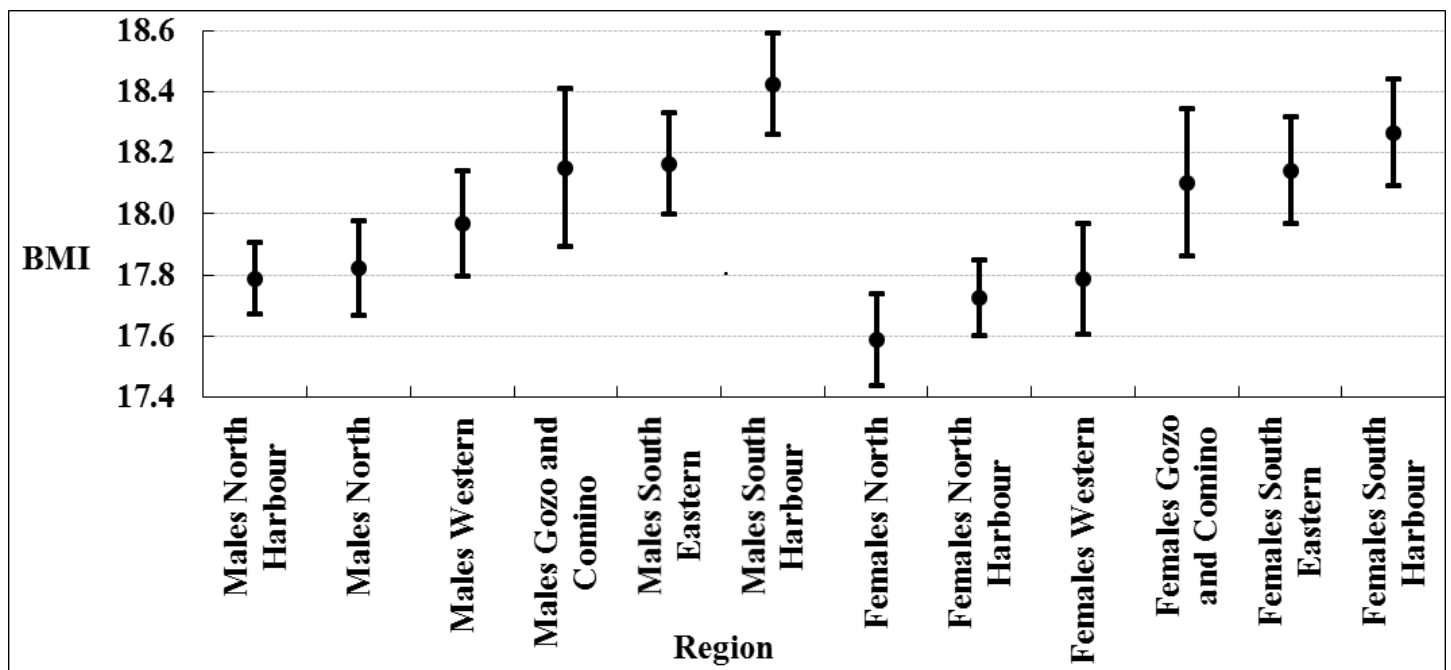
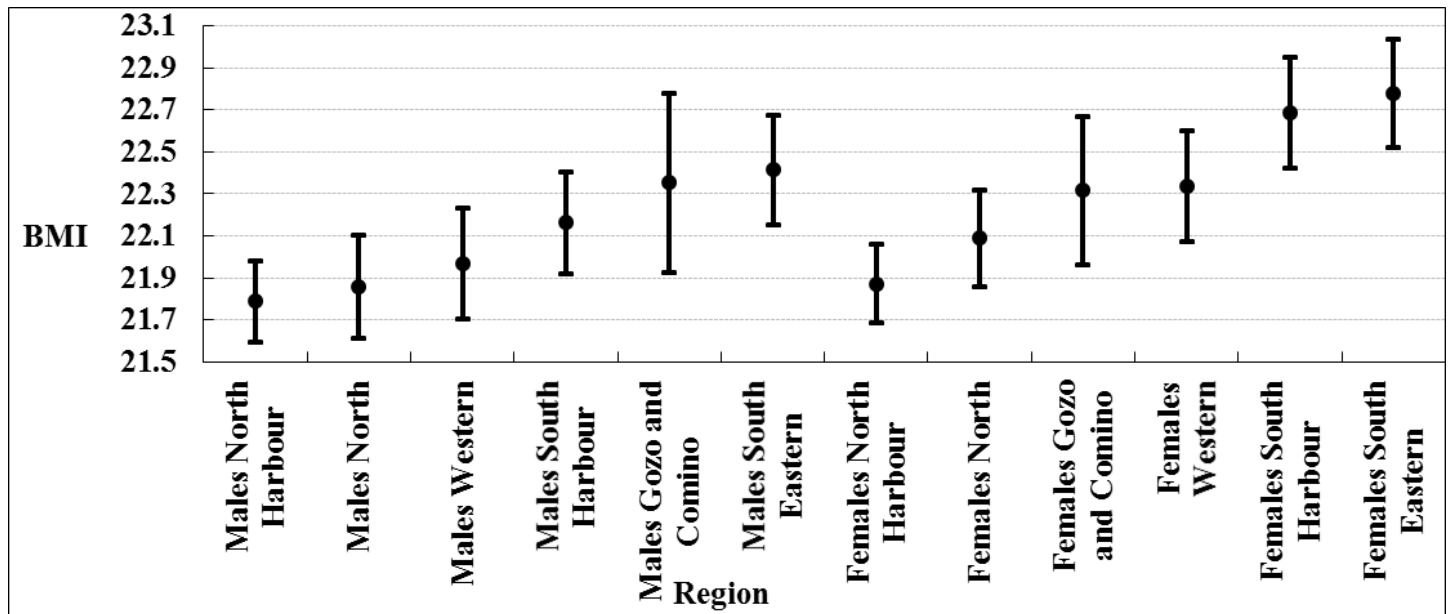


Figure 2: Ranked body mass index mean (and 95% confidence intervals) by region for secondary school males and females



These trends demonstrate a relationship between socioeconomic status and obesity, reinforcing studies done in other countries. For example, American datasets over the years have shown that higher levels of childhood overweight and obesity were present in families with parents having a lower level of education, those living below the poverty level and those living in low-income neighbourhoods¹². However, this is overlaid by increasing trends in obesity rates in children of parents of all income levels and educational levels.¹³

The main strengths of this study are derived from the inclusion of the entire childhood school-age cohort. This provided the researchers with a detailed picture of the real situation regarding the obesity epidemic in Malta and will assist the local authorities when channelling limited resources into the right areas. These results show that the South East and Southern Harbour areas need the highest focus of attention. Other strengths are that results reported were measured directly, not self-reported as in several other studies. Using the same instruments helped reduce inter-observer bias. A regular mechanism of checking and recalibration of scales was done before and after the end of each study period. Training teachers also helped reduce bias using measurement techniques that were part of standard operating procedures developed for the purpose of the pilot European Health Examination Survey.¹⁴ Due to the large number of students

involved, data collection was limited to a number of key factors.

Obesity is an important health determinant. Despite the North-South differences, all regions show a high prevalence of overweight and obesity. Following these results, further research into socioeconomic determinants of local overweight and obesity should be embarked upon as these may yield insights into how best to target the problem from both the prevention and intervention aspects. A regular repetition of this study would also be beneficial to determine trends of childhood overweight and obesity in Malta. For more detailed information, our research group suggests obtaining more details from each child's address (e.g. postcode) in future which would help us map in quite some detail the problem of obesity on our island and help us search for any hotspots that require particular attention. Detailed mapping would enable further correlations to causes, other than socioeconomic factors, of obesity like fast food chain outlets and lack of outdoor spaces in the area. The research group will also strive in future repetitions of this study to connect our data to the National Obstetric Information System to link childhood obesity to maternal prenatal nutritional issues. This study is showing our Government how big the problem of obesity is on our island and also attempts at showing which regions need special consideration. Government should strengthen all preventive measures possible to try and stop

children from becoming overweight. While the overall percentage of overweight and obese children has remained relatively stable over recent years, our results show that the rate of obesity has now surpassed the rate of overweight in Maltese children. These children should be given the best possible support by our national health service to tackle their weight issues and thus the creation of an obesity clinic run by a dedicated multidisciplinary team is needed, now more than ever.

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