

PREVALENCE OF OVERWEIGHT AND OBESITY AT THE AGE OF 6 AND 10 AND 14 YEARS AND ITS CORRELATION TO OBESITY AT THE AGE OF 3 YEARS IN SOUTHERN ISRAEL (2002-2011)



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Background

Obesity among children has become a worldwide epidemic. It is a threat to health and quality of life and imposes an economic burden on society.

Objectives

1. To evaluate yearly trends in overweight and obesity in 6 year old children (2002-2011).
2. To correlate children' BMI percentiles at age ~6 years to their BMI percentiles at age ~3, ~10 and ~14 years.

Setting

- A community child health center in southern Israel serving a population of 6500 children from birth to the age of 18 years.

Methods

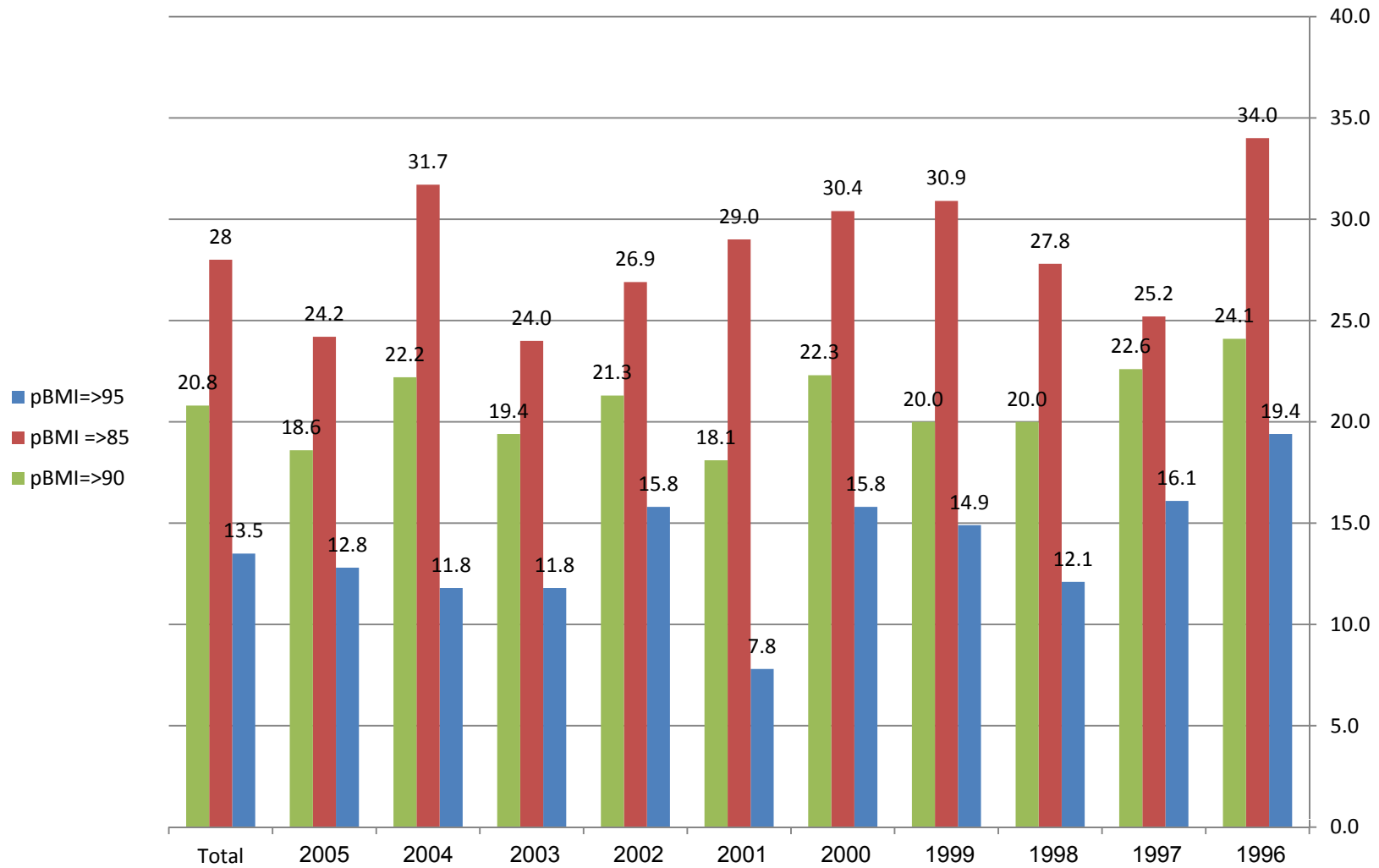
- All children who were born in the years 1996-2005, were invited for measurements of height and weight at the age of ~6 years.
- Those who were born in the years 1996-2011 were invited again at the age of ~10 years.
- Those who were born in the years 1995-1997 were invited again at the age of ~14 years.
- Measurements of these children, at the age of ~3 years, were collected from the medical records.
- Face to face interviews with a sample of parents, using a structured questionnaire.

RESULTS

Overweight and Obesity at the age of ~6 years

Year of birth	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Invited	332	326	316	327	295	272	336	347	332	333	3216
Measured	141 (42.5%)	155 (47.5%)	140 (44.3%)	181 (55.4%)	184 (62.4%)	193 (71%)	305 (90.8%)	288 (83%)	306 (92.2%)	209 (87.1%)	2183 (68%) M-1068 / F-1115
pBMI 85-94	21/141 (14.9%)	14/155 (9.0%)	22/140 (15.7%)	29/181 (16.0%)	27/184 (14.7%)	41/193 (21.2%)	34/305 (11.1%)	35/288 (12.2%)	61/306 (19.9%)	33/290 (11.4%)	317/2183 (14.5%) M-12.7% / F-16.2%
pBMI=>95	27/141 (19.1%)	25/155 (16.1%)	17/140 (12.1%)	27/181 (14.9%)	29/184 (15.8%)	15/193 (7.8%)	48/305 (15.8%)	34/288 (11.8%)	36/306 (11.8%)	37/290 (12.8%)	295/2183 (13.5%) M-13.6% / F-13.5%
pBMI =>85	48/141 (34%)	39/155 (25.2%)	39/140 (27.8%)	56/181 (30.9%)	56/184 (30.4%)	56/193 (29%)	82/305 (26.9%)	69/288 (24.0%)	97/306 (31.7%)	70/290 (24.2%)	612/2183 (28.0%) M-26.3% / F-29.7%
pBMI=>90	34/141 (24.1%)	35/155 (22.6%)	28/140 (20%)	38/181 (20.0%)	41/184 (22.3%)	35/193 (18.1%)	65/305 (21.3%)	56/288 (19.4%)	68/306 (22.2%)	54/290 (18.6%)	454/2183 (20.8%) M-20% / F-21.5%

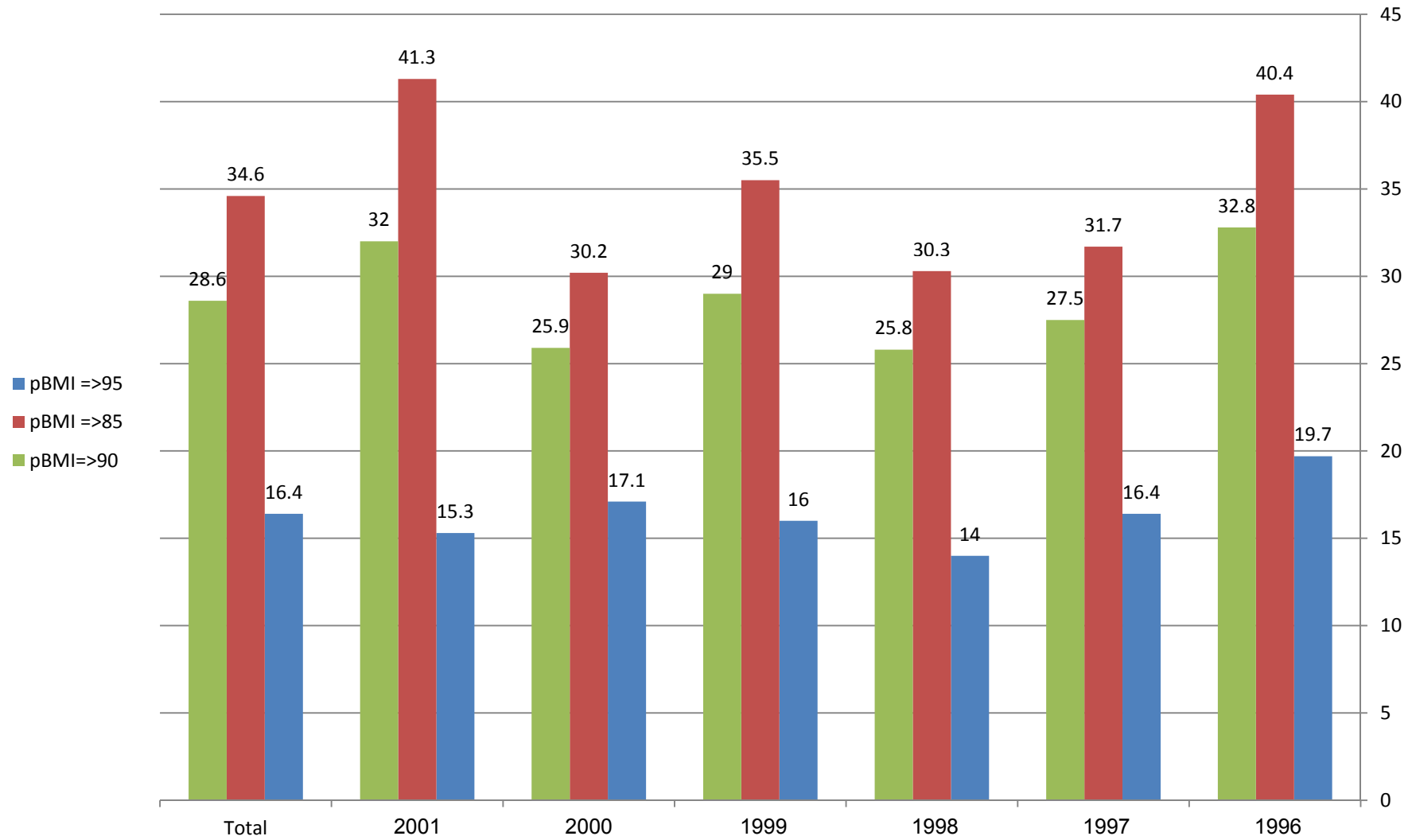
Trends in Overweight and Obesity at the age of ~ 6 years



Overweight and Obesity at the age of ~10 years

Year of birth	1996	1997	1998	1999	2000	2001	Total
Invited	267	267	258	282	245	246	1565
Measured	183 (68.5%)	189 (70.8%)	221 (85.7%)	200 (70.9%)	205 (83.7%)	150 (61%)	11478 (73.4%) M-590 / F-557
pBMI 85-94	38/183 (20.8%)	29/189 (15.3%)	36/221 (16.3%)	39/200 (19.5%)	27/205 (13.2%)	39/150 (26%)	209/11478 (18.2%) M-17.8% / F-18.7%
pBMI =>95	36/183 (19.7%)	31/189 (16.4%)	31/221 (14.0%)	32/200 (16.0%)	35/205 (17.1%)	23/150 (15.3%)	188/1148 (16.4%) M-18.8% / F-13.8%
pBMI =>85	74/183 (40.4%)	60/189 (31.7%)	67/221 (30.3%)	71/200 (35.5%)	62/205 (30.2%)	62/150 (41.3%)	397/1148 (34.6%) M-36.6% / F-32.5%
pBMI=>90	60/183 (32.8%)	52/189 (27.5%)	57/221 (25.8%)	58/200 (29.0%)	53/205 (25.9%)	48/150 (32%)	328/1148 (28.6%) M-30.5% / F-26.5%

Trends in Overweight and Obesity at the age of ~ 10 years



Overweight and Obesity at the age of ~14 years

Year of birth	1995	1996	1997	Total
Invited	228	249	246	723
Measured	214 (93.6%)	238 (95.6%)	214 (87%)	666 (92.1%) M-325 / F-341
pBMI 85-94	34/214 (15.9%)	45/238 (18.9%)	45/214 (21%)	124/666 (18.6%) M-20.6% / F-16.7%
pBMI =>95	24/214 (11.2%)	29/238 (12.2%)	27/214 (12.6%)	80/666 (12%) M-11.7% / F-12.3%
pBMI =>85	58/214 (27.1%)	74/238 (31.1%)	72/214 (33.6%)	204/666 (30.6%) M-32.3% / F-29%
pBMI=>90	46/214 (21.5%)	55/238 (23.1%)	51/214 (23.8%)	152/666 (22.8%) M-23% / F-22.6%

Overweight and Obesity at the age of ~18years

Year of birth	1991-1993
Invited	402
Measured	331 (82.8%) M-170 F-161
pBMI 85-94	37/331 (11.2%) M-12.3% F-9.9%
pBMI =>95	29/331 (8.8%) M-9.4% F-8%
pBMI =>85	66/331 (20%) M-21.8% F-18%
pBMI=>90	49/331 (14.8%) M-15.9% F13.7%

Children measured at age ~6 and at age ~10 years

Year of birth	1996	1997	1998	1999	2000	2001	Total
Measured	86	103	106	135	148	129	707
<u>pBMI =>85</u> At age 6 At age 10 (% of age 6)	33 29/33 (88%)	28 24/28 (86%)	32 28/32 (87.5%)	56 46/56 (82.1%)	47 40/47 (85.1%)	45 44/45 (97.8%)	241/707(34.1%) 211/241(87.6%)
<u>pBMI =>95</u> At age 6 At age 10 (% of age 6)	19 15/19 (79%)	18 16/18 (89%)	14 13/14 (92.8%)	30 18/30 (60.0%)	25 17/25 (68%)	16 10/16 (62.5%)	122/707 (17.3%) 89/122 (73%)
<u>pBMI =85 - 94</u> At age 10	4/19 (21%)	2/18 (11%)	1/14 (7.2%)	11/30 (36.7%)	5/25 (20%)	6/16 (37.5%)	29/122 (23.8%)

Overweight and Obesity at the age of ~3 years

Measured	729
M	380
F	349
pBMI =85-94	66/729 (9%)
M	31/380 (8.2%)
F	35/349 (10%)
pBMI =>95	77/729 (10.6%)
M	36/380 (9.5%)
F	41/349 (11.7%)
pBMI =>85	143/729 (19.6%)
M	67/380 (17.6%)
F	76/349 (21.8%)
pBMI =>90	111/729 (15.2%)

Children measured at age ~3 and at age ~6 years

Measured	603
<u>pBMI =>85</u> At age 3 At age 6 (% of age 3)	128/603 (21.2%) 111/128 (86.7%)
<u>pBMI =>95</u> At age 3 At age 6 (% of age 3)	70/603 (11.6%) 57/70 (84.3%)
<u>pBMI =85 -94</u> At age 6 (% of age 3)	9/70 (12.8%)

Children measured at age ~3 and at age ~10 years

Measured	119
<u>pBMI =>85</u> At age 3 At age 10 (% of age 3)	26/119 (21.8%) 22/26 (84.6%)
<u>pBMI =>95</u> At age 3 At age 10 (% of age 3)	21/119 (17.6%) 17/21 (80.9%)
<u>pBMI =85 -94</u> At age 10 (% of age 3)	4/21 (19%)

Children measured at age ~10 and at age ~14 years

Measured	393
<u>pBMI =>85</u> At age 10 At age 14 (% of age 10)	151/393 (38.4%) 122/151 (80.8%)
<u>pBMI =>95</u> At age 10 At age 14 (% of age 10)	75 49/75(65.3%)
<u>pBMI =85 -94</u> At age 14 (% of age 10)	21/75 (28%)

Children measured at age ~14 and at age ~18 years

Measured	116
<u>pBMI =>85</u> At age 14 At age 18(% of age 14)	50/116 (43%) 37/50 (74%)
<u>pBMI =>95</u> At age 14 At age 18(% of age 14)	27 18/27 (66.6%)
<u>pBMI =85 -94</u> At age 18(% of age 14)	7/27 (26%)

Children measured at age ~10 and at age ~18 years

Measured	49
<u>pBMI =>85</u> At age 10 At age 18(% of age 10)	20/49 (40.8%) 13/20 (65%)
<u>pBMI =>95</u> At age 10 At age 18(% of age 10)	13 9/13 (69%)
<u>pBMI =85 -94</u> At age 18(% of age 10)	1/13 (7.7%)

Children measured at age ~6 and at age ~14 years

Measured	224
<u>pBMI =>85</u> At age 6 At age 14 (% of age 6)	71/224 (31.7%) 57/71 (80.3%)
<u>pBMI =>95</u> At age 6 At age 14 (% of age 6)	41 24/41(58.5%)
<u>pBMI =85 -94</u> At age 14 (% of age 6)	12/41 (29.3%)

Overweight and Obesity at the age of 6 and 10 years in Bedouin children in Southern Israel

Age (Y)	6	10
Measured	324	130
M	175	
F	149	
pBMI 85-94	28/324 (8.6%)	16/130 (12.3%)
M	12/175 (6.8%)	
F	16/149 (10.7%)	
pBMI =>95	9/324 (2.8%)	10/130 (7.7%)
M	3/175 (1.7%)	
F	6/149 (4%)	
pBMI =>85	37/324 (11.4%)	26/130 (20%)
M	15/175 (8.6%)	
F	22/149 (14.8%)	
pBMI =>90	25/324 (7.7%)	

עודף משקל והשמנת יתר, השוואה בין ילדים יהודים ובדואים ובין מתבגרים "צעירים" (12-15) ומתבגרים "בוגרים" (15-18)

		המגזר היהודי		המגזר הבדואי	
קבוצת גיל	בנים	בנות	בנים	בנות	סה"כ
"צעירים"	(52.3%)92	(48.1%)78	(75.8%)157	(67.6%)169	(62.4%)496
"בוגרים"	(47.7%)84	(51.9%)84	(24.2%)50	(32.4%)81	(37.6%)299
סה"כ	(25.1%)176	(47.9%)162	(45.3%)207	(54.7%)250	(100%)795
	(52.1%)338		(57.5%)457		(100%)795

עודף משקל והשמנת יתר, השוואה בין בנים יהודים ובדואים

בנים בדואים			בנים יהודים		
"בוגרים" N=50	"צעירים" N=157		"בוגרים" N=84	"צעירים" N=92	
4%	6.4%	השמנת יתר	9.5%	18.5%	השמנת יתר
20%	10.2%	עודף משקל	10.7%	13%	עודף משקל
24%	26.6%	סה"כ	20.2%	31.5%	סה"כ

עודף משקל והשמנת יתר, השוואה בין בנות יהודיות ובדואיות

בנות בדואיות			בנות יהודיות		
"בוגרים" N=81	"צעירים" N=169		"בוגרים" N=84	"צעירים" N=78	
7.4%	4.1%	השמנת יתר	3.6%	7.7%	השמנת יתר
17.3%	13%	עודף משקל	6%	21.8%	עודף משקל
24.7%	17.2%	סה"כ	9.5%	29.5%	סה"כ

Summary

1. Overweight and Obesity are prevalent among 6 years old children in southern Israel.
2. We found that 29% of the 6 years old children had $pBMI \geq 85$ and this result is consistent during the 7 years of the study period.
3. Of them half have $pBMI \geq 95$.
4. More than 90% of the obese children at the age of 6 years old, will also be obese at the age of 10 years.
5. More than 20% of the 3 years old children were found to be overweight or obese.
6. More than 90% of them will still be overweight or obese at the age of 6 and 10 years old.

Conclusions

- Findings show that many of the parents believe that overweight at early ages will disappear when the child will grow up.
- Education for overweight and obesity prevention among children should start as early as possible with parents as the main targets.