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Alarming trends in pediatric overweight in the United States

Summary

Objectives: A comprehensive review of the pediatric overweight literature was undertaken to examine secular changes in the prevalence of pediatric overweight, the current magnitude and scope of pediatric overweight, and the identity of high-risk groups in the U.S.

Methods: Articles published in the last two decades and studies of nationally representative numbers of children were highlighted.

Results: An unprecedented three-fold increase in the prevalence of pediatric overweight has occurred in recent decades in the U.S. and evidence suggests that this trend is continuing unabated. While no sociodemographic or racial group has escaped this trend, particularly at risk are African American girls, Hispanic girls and boys, and children from low-income households.

Conclusions: The rising prevalence of pediatric overweight in the U.S. is a harbinger of increases in diabetes, cardiovascular disease and numerous other health problems. Furthermore, disparities in pediatric overweight along ethnic and socio-economic lines are expected to further exacerbate current disparities in rates of chronic disease. Strategies and programs to prevent overweight among children are urgently needed.

Keywords: Obesity – Overweight – Prevalence – Children – Adolescents.

Pediatric overweight has been associated with increased health risks during childhood: type 2 diabetes mellitus, hyperinsulinemia, metabolic syndrome (Pinhas-Hamiel et al. 1996; Freedman et al. 1999; Sinaiko et al. 2001; Valle et al. 2002), hypertension, dyslipidemia (Figueroa-Colon et al. 1997; Freedman et al. 1999; Morrison et al. 1999a; b), respiratory problems (Leung & Robson 1999) and increased stress on weight bearing joints (Bray 1985). By 5–10 years of age, 60% of overweight children have been estimated to have one associated biochemical or clinical cardiovascular risk factor and 25% have two or more (Freedman et al. 1999). Further, overweight children have been found to suffer more emotional problems and consider themselves poorer students compared to their non-overweight counterparts (Falkner et al. 2001).

The few studies that have examined the long-term effect of pediatric overweight on adult morbidity suggest that obesity-related disease can begin in childhood and that pediatric overweight increases the risk of adult morbidity and mortality independent of adult weight (Dietz 1998; Must & Strauss 1999). Longitudinal data from the Bogalusa Heart Study showed that overweight, hypertension, and dyslipidemia in childhood were predictive of the occurrence of these risk factors in young adults (Bao et al. 1997). Overweight during childhood has also been associated with metabolic syndrome (characterized by a combination of hypertension, dyslipidemia, and insulin resistance) during adulthood (Vanhala et al. 1999; Valle et al. 2002). Likewise, data from a 57-year follow-up of a British cohort indicated that heavier children suffered increased adult risk of mortality from heart disease as well as all-cause adult mortality (Gunnell et al. 1998). In adults obesity is estimated to be second only to smoking as the leading preventable cause of death in the U.S. (Allison et al. 1999).

It is critical to examine the secular trends that have occurred in pediatric overweight in the U.S. as a means of gauging the potential impact of this public health concern in the future. The purpose of this examination of the prevalence of overweight among children in the U.S. is three-fold: 1) to document the national changes in pediatric overweight over the past several decades; 2) to determine the current magnitude and scope of pediatric overweight; 3) to identify high-risk groups of children; and 4) to discuss implications of the findings.

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Methods

Bibliographic criteria

Literature in the area of pediatric overweight was reviewed. Articles were selected based on the following criteria: 1) main topic was prevalence of pediatric overweight; 2) study sample was comprised of or included children between the ages of 0 to 18 years; and 3) the study was conducted in the U.S. Articles published in the last two decades and studies of nationally representative samples of children were the main focus.

Definitions

Overweight is commonly determined by weight adjusted for height. The most widely used weight-for-height index is body mass index (BMI), which is calculated as weight in kilograms divided by the square of height in meters (Keys et al. 1972). BMI has recently been recommended for use in population-based studies of adults, as well as children (Cole 1991; Dietz & Bellizzi 1999). The newly revised U.S. pediatric growth charts include sex-specific BMI-for-age percentile distributions for ages 2-20 years (Kuczmarski et al. 2000). For children and adolescents the current suggested classifications-based on BMI are: "at risk of overweight" for youths with BMI-for-age between the 85th and 95th percentiles, and "overweight" for youths with BMI-for-age ≥95th percentile (Barlow & Dietz 1998). As most studies did not report measurements of adiposity, the terms "obese" and "obesity" are not used. Instead the terms "at risk of overweight" and "overweight" are used in accordance with the above definitions. The reader is cautioned, however, that the literature, both popular and scientific, abounds with the word "obesity" and that in describing this body of literature, the use of the word "obesity" is sometimes unavoidable.

Results of review

Secular trend in overweight

Representative samples of between 3000 and 14000 youths aged six through 19 years were examined in each of six U.S. national surveys (National Health Examination Surveys [NHES] or National Health and Nutrition Examination Surveys [NHANES]) conducted between 1963 and 2000. Each national survey utilized complex, stratified, multistage, probability cluster design. Overweight prevalence more than tripled from the first survey (1963–1965) to the 1999–2000 survey among all gender and age groups of older children (Ogden et al. 2002) (Tab. 1).

Table 1 Trends in prevalence of "overweight"[a] among U.S. youths of all ethnic groups aged 6–19 years.[b] (Data source: Ogden et al. 2002)

U.S. Survey and years	Overweight (%)			
	6–11 year olds		12–19 year olds	
	Males	Females	Males	Females
NHES II or III (1963–1970)	4.0	4.5	4.5	4.7
NHANES I (1971–1974)	4.3	3.6	6.1	6.2
NHANES II (1976–1980)	6.6	6.4	4.8	5.3
NHANES III (1988–1994)	11.6	11.0	11.3	9.7
NHANES 1999–2000	16.0	14.5	15.5	15.5

[a] BMI-for-age ≥ 95th percentile of the revised NCHS/CDC growth charts constitutes "overweight".
[b] NHES, National Health Examination Survey; NHANES, National Health and Nutrition Examination Survey.

National survey data for children under six years of age based on between 1200 and 7500 children indicated that prevalence of overweight increased between the 1971–1974 survey (data not available in NHANES I for 6- to 23-month-old category) and the 1999–2000 survey for both genders and age groups (Ogden et al. 2002) (Tab. 2). Data for low-income children (0–5 years) revealed that rates of overweight increased between 1983 and 1995 (based on the Centers for Disease Control and Prevention Pediatric Nutrition Surveillance System or PedNSS) (Mei et al. 1998) (Tab. 3). In both the nationally representative and low-income surveys, the most dramatic increases in overweight occurred among the older (4–5 year old) preschoolers.

Current prevalence of overweight

The most recent national data from 1999–2000 indicate that overweight among children in the U.S. is occurring at an unprecedented rate. It is estimated that 15.3% of children ages 6–11 years and 15.5% of adolescents ages 12–19 years are

Table 2 Trends in prevalence of "overweight"[a] among U.S. youths of all ethnic groups aged 6 months–5 years.[b] (Data source: Ogden et al. 2002)

U.S. Survey and years	Overweight (%)			
	6–23 month olds		2–5 year olds	
	Males	Females	Males	Females
NHANES I (1971–1974)	[c]	[c]	5.0	4.9
NHANES II (1976–1980)	8.2	6.1	4.7	5.3
NHANES III (1988–1994)	9.9	7.9	6.1	8.2
NHANES 1999–2000	9.8	14.3	9.9	11.0

[a] Weight-for-length (for children < 2 years old) or BMI-for-age (for children ≥2 years old) ≥95th percentile of the revised NCHS/CDC growth charts constitutes "overweight".
[b] NHANES, National Health and Nutrition Examination Survey.
[c] NHANES I did not include children younger than 1 year.

Table 3 Prevalence of "at risk of overweight" and "overweight" among low-income children 0–59 months from 1983–1995.[a] (Data source: Mei et al. 1998)

Age (months)	At risk of overweight			Overweight		
	1983	1995	Relative increase (%)	1983	1995	Relative increase (%)
Total (0–59)	18.6	21.6	16.1	8.5	10.2	20.0
0–11	22.7	25.5	12.3	9.9	11.3	14.1
12–23	23.3	26.0	11.6	12.1	13.7	13.2
24–35	14.2	16.8	18.3	5.6	7.0	25.0
36–47	15.8	18.6	17.7	7.0	8.5	21.4
48–59	17.2	21.2	23.3	8.2	10.6	29.2

[a] Weight-for-length (for children ≤2 years old) or weight-for-stature (for children > 2 years old) between the 85th and 95th percentiles or above the 95th percentiles of NCHS reference curves (Hamill et al. 1979) constitute "at risk of overweight" and "overweight", respectively.

Table 4 Prevalence of "overweight or at risk of overweight"[a] and "overweight"[b] from NHANES 1999–2000. (Data source: Ogden et al. 2002)

Group	Overweight or at risk (%)	Overweight (%)
All children		
2–5 years	20.6	10.4
6–11 years	30.3	15.3
12–19 years	30.4	15.5
All males		
2–5 years	20.9	9.9
6–11 years	32.7	16.0
12–19 years	30.5	15.5
All females		
2–5 years	20.4	11.0
6–11 years	27.8	14.5
12–19 years	30.2	15.5
Males 2–5 by race/ethnicity		
White (non-Hispanic)	21.4	8.8
African American (non-Hispanic)	12.6	5.9
Mexican-American	26.0	13.0
Males 6–11 by race/ethnicity		
White (non-Hispanic)	29.4	12.0
African American (non-Hispanic)	34.5	17.1
Mexican-American	43.0	27.3
Males 12–19 by race/ethnicity		
White (non-Hispanic)	27.4	12.8
African American (non-Hispanic)	35.7	20.7
Mexican-American	44.2	27.5
Females 2–5 by race/ethnicity		
White (non-Hispanic)	19.7	11.5
African American (non-Hispanic)	26.6	11.2
Mexican-American	19.5	9.2
Females 6–11 by race/ethnicity		
White (non-Hispanic)	22.8	11.6
African American (non-Hispanic)	37.6	22.2
Mexican-American	35.1	19.6
Females 12–19 by race/ethnicity		
White (non-Hispanic)	25.4	12.4
African American (non-Hispanic)	45.5	26.6
Mexican-American	43.5	19.4

[a] BMI-for-age ≥ 85th percentile based on the revised NCHS/CDC growth charts constitutes "overweight or at risk of overweight".
[b] BMI-for-age ≥ 95th percentile based on the revised NCHS/CDC growth charts constitutes "overweight".

currently overweight, representing a 4–5-percentage point increase from data collected earlier in the same decade (Ogden et al. 2002). Based on self-reported rather than measured heights and weights used in the aforementioned surveys, another nationally representative study (the 1999 Youth Risk Behavior Surveillance System or YRBSS), also showed increasing prevalence of overweight among adolescents. Nationwide, 16.0% of teens are at risk of becoming overweight (17.5% of males, 14.4% of females), while 9.9% of teens are overweight (11.9% of males, 7.9% of females) (Kann et al. 2000).

High-risk groups

The most current complete national overweight prevalence estimates (from NHANES 1999–2000) by gender, age, and race/ethnic groups for approximately 4000 2- to 19-year-old children showed that the rates of overweight were among the highest for Mexican American and African Americans in all but the youngest age groups (Ogden et al. 2002) (Tab. 4). A recent compilation of nine large epidemiological studies (including NHANES II and III) of 66772 children age five to 17 years confirmed this finding (Rosner et al. 1998). Figures 1, 2 and 3 illustrate the dramatic increases in overweight that have occurred for all age and race groups of children except White preschool-age boys. The prevalence of overweight is particularly high among African American girls and Hispanic boys. It should be noted that at 6–11 and 12–19 years of age no data are available for Hispanic children in NHANES II. However, a national survey of Hispanics conducted in 1982–84 (Hispanic HANES) showed that Mexican American children consistently had higher rates of overweight than all other groups except school-age African American girls (Kaplowitz et al. 1989).

Differences among populations designated as Hispanic have been documented. Based on Hispanic HANES data, over-

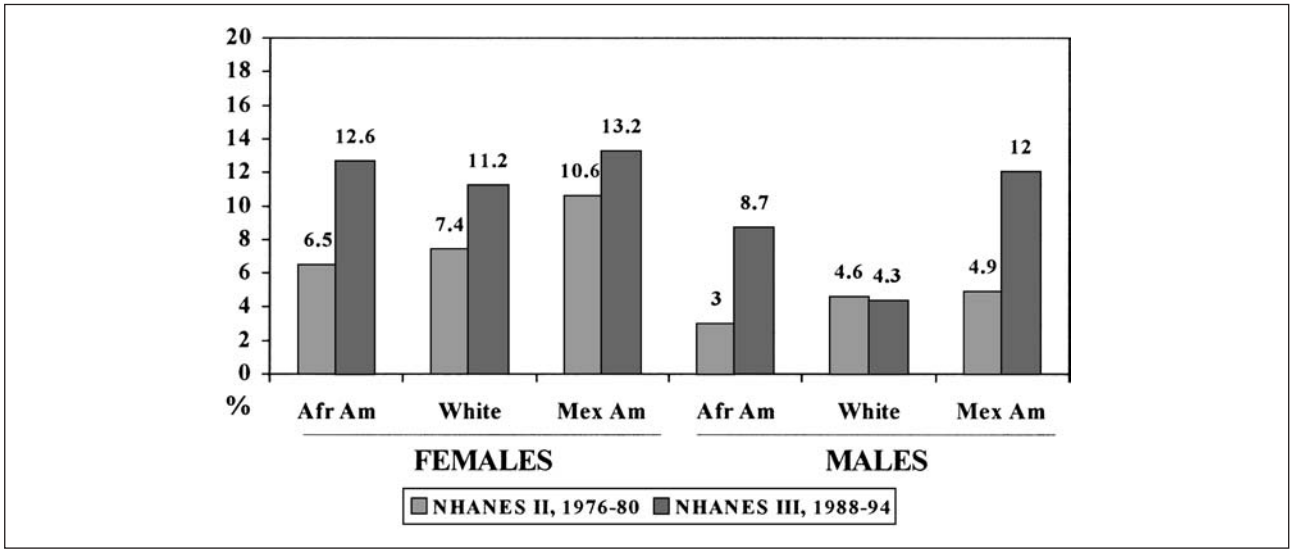

Figure 1 Trends in prevalence of "overweight"[a] by ethnic group[b] among U.S. youth aged 4–5 years[c]. Data source: Ogden et al. 1997; data for Mexican Americans are from Hispanic HANES, 1982–84. [a] Based on 1977 NCHS growth charts: weight-for-length and weight-for-stature (Hamill 1979). [b] African American and Whites are non-Hispanic. [c] NHANES 1999–2000 data not available due to small sample size for this age group

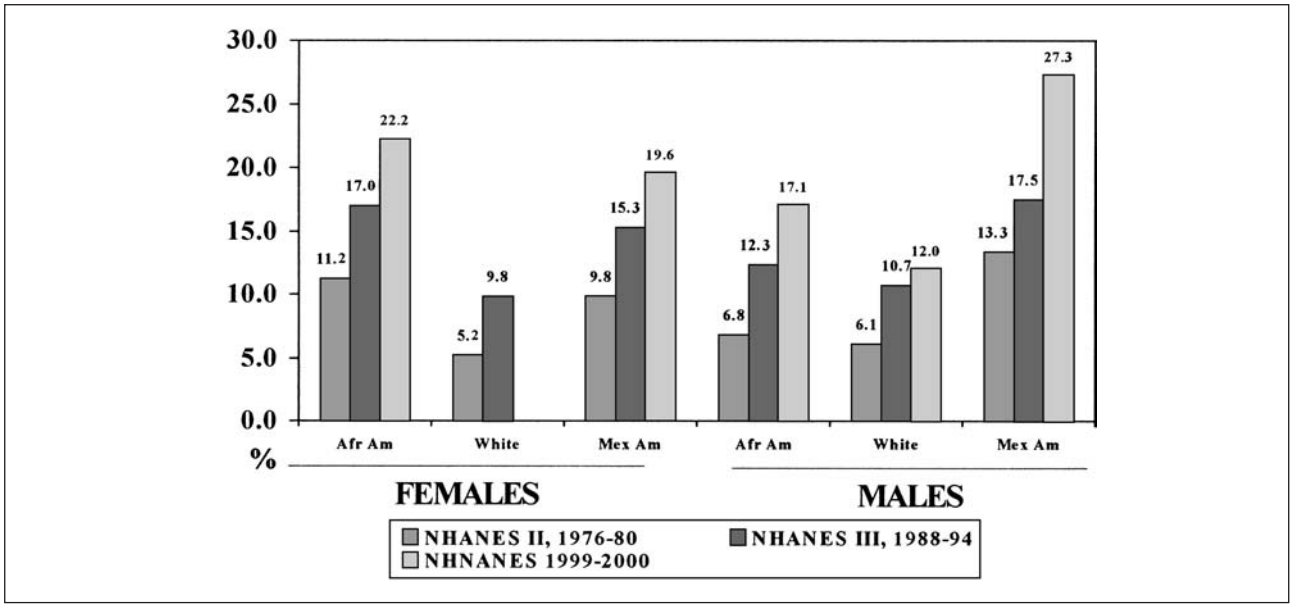

Figure 2 Trends in prevalence of "overweight"[a] by ethnic group[b] among U.S. youth aged 6–11 years. Data source: NCHS 2002; data were not available for White girls in 1999–2000 because estimate considered unreliable due to high relative standard error. Initial data for Mexican Americans are from Hispanic HANES, 1982–84. [a] BMI-for-age ≥ 95th percentile of the revised NCHS/CDC growth charts constitutes "overweight". [b] African American and Whites are non-Hispanic

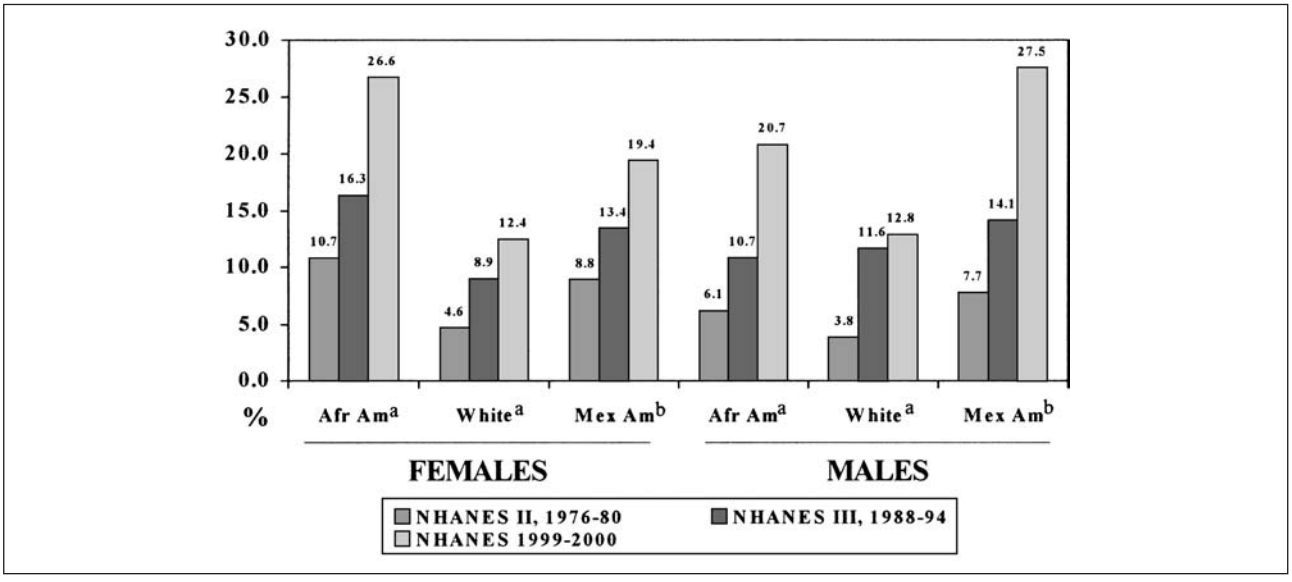

Figure 3 Trends in prevalence of "overweight"[a] by ethnic group[b] among U.S. youth aged 12–19 years. Data source: NCHS 2002. Initial data for Mexican Americans are from Hispanic HANES, 1982–84. [a] BMI-for-age ≥ 95th percentile of the revised NCHS/CDC growth charts constitutes "overweight". [b] African American and Whites are non-Hispanic

weight was more prevalent in Puerto Rican adolescents compared to Mexican Americans and Cubans (Pawson et al. 1991). However, data collected a decade later from the National Longitudinal Study of Adolescent Health (Add Health Study), the largest nationally representative survey of teens completed to date (N ≈ 14000), indicated that prevalence of BMI ≥ 85th percentile was similar (32.2% to 33.1%) for Mexican American, Puerto Rican, and Cuban adolescents, aged 13–18 years. It is noteworthy that significant generational differences were observed. Approximately 33% of second and third generation Hispanic adolescents were at risk of overweight, compared with only 26% in the first generation (Popkin & Udry 1998).

There is a paucity of national data on the health and weight status of Asian Americans in general and among Asian American children in particular. In 1997, 9.6% of Asian American/Pacific Islander children from PedNSS, aged 2–5 years, were considered overweight, compared to 7–8% of Whites and African Americans, and 12% of Hispanics (Mei et al. 1998). Among populations currently classified as "Asian American," considerable heterogeneity appears to exist in the prevalence of overweight, attributable possibly to differences in ethnic origin and acculturation effects. For example, in an investigation of 307 first-generation low-income young children followed longitudinally from birth to five years of age, Hmong, but not Lao, children showed evidence of overweight (Hyslop et al. 1996). In the Add Health Study, Chinese and Filipino adolescents showed substantially lower prevalence of overweight and risk of overweight than Whites (15.3% and 18.5% respectively vs 24.2%). However, for a combination of other Asians in the U.S., notably Koreans, Japanese, Southeast Asian, and Asian Indians, the rate was high (28.2%). Although the prevalence rate of overweight among first generation Asians (16%) was lower than among first generation Hispanics (26%), second and third generation Asian Americans (31%, 35%) experienced rates of overweight comparable to their Hispanic counterparts (Popkin & Udry 1998). Further, there is evidence that weight-related health risk may be higher among South Asian children as indicated by higher levels of insulin resistance at lower body weights (Whincup et al. 2002).

Studies have shown a striking increase in overweight rates among American Indian children and adults during the past 35 years (Story et al. 1999; Eisenmann et al. 2000). While variation exists in rates of overweight across tribes, all studies indicate that overweight is widespread in American Indian youth. Data from low-income American Indian children aged 2–4 years (PedNSS) showed that 12% were overweight compared to only 6% of White children (CDC 1996). Two large studies of American Indian school-aged children conducted during the 1990s showed that age-adjusted prevalence of overweight for males and females were 22% and 18%, respectively. Even at the youngest school ages, overweight was more than twice as likely as for U.S. youth in general (Jackson 1993; Zephier et al. 1999).

Socio-economic status (SES) is a useful indicator of a constellation of environmental and familial risk factors potentially related to overweight. Among U.S. children, the relationship between SES and weight status appears complex (Crawford et al. 2001). Among White children, several studies have found that poverty was associated with less fatness in very young children, but that during adolescence, at least among girls, this trend reversed (Garn et al. 1981; Jones et al. 1985; Troiano & Flegal 1998). The relationship between SES and weight status among other ethnic groups is less clear. In the largest longitudinal study in the U.S. of African American and White preadolescent (aged 9–10 years) girls, an inverse association between SES and overweight prevalence was observed only among Whites (Patterson et al. 1997). Evidence from NHANES III also suggests the absence of a relationship between overweight prevalence and income or education among African American and Mexican American children ages 6–17 years of age, though these data should be cautiously interpreted because several of the estimates have large coefficients of variation (Troiano & Flegal 1998). Some studies of African American adolescents have shown an inverse relationship between SES and weight status, similar to that seen in White children (Jones et al. 1985; Goodman 1999; Treiber et al. 1999; McMurray et al. 2000).

Some studies suggest that low SES may be a risk factor for overweight among young children (Gerald et al. 1994; Sherman et al. 1995). The prevalence of overweight among low-income 4-year-olds (in the Supplemental Feeding Program for Women, Infants and Children) was 10.6% in 1995 (Mei et al. 1998), compared to a rate of 7.9% for a nationally representative sample of 4- to 5-year-olds in 1994 (Ogden et al. 1997). Similarly several studies of other low-income preschool children have found a high prevalence of overweight, ranging from 10% (Wiecha & Casey 1994) up to 32% (Hernandez et al. 1998).

Risk factors for overweight among kindergarten-aged children include low maternal level of education, and English as a second language (Hausken 1998). Corroboration of some of these findings comes from a 6-year follow-up study of a cohort of normal weight children ages 0 to 8 years at baseline (the National Longitudinal Study of Youth), which showed that children who lived with nonworking parents, nonprofessional parents, and/or mothers who did not complete high school all had an increased likelihood of overweight. The inverse linear relationship between household income and increased risk of childhood overweight was also confirmed (Strauss & Knight 1999).

Finally, there is some evidence to suggest that childhood SES influences adulthood weight status, independent of adult SES (Brunner et al. 1999). Analysis of a cohort followed from birth in 1946 revealed that childhood social class, based on paternal occupation, was inversely associated with adult BMI after controlling for educational attainment and adult social class (Hardy et al. 2000). In a recent systematic review of the literature, Parsons et al. confirmed the lack of a consistent relationship between SES in early life and childhood overweight (Parsons et al. 1999). However, a strong and consistent relationship was observed across studies between low SES in childhood and overweight in adulthood.

Discussion

We know of no comparable epidemic of pediatric overweight in human history. While some differences exist, nearly all ethnic, racial, gender, socioeconomic and age groups in the U.S. have shown increases in prevalence of overweight in recent decades. Rates for most groups have tripled and rates for older African American girls and Hispanic boys have nearly quadrupled. Of particular concern are the effects of acculturation with data from both Hispanic and Asian populations showing increasing overweight among second and third generation children in comparison to first generation immigrants.

There are several possible models for the increase in the prevalence of overweight in recent years. For example, one subgroup of the U.S. population may be heavier now than in the past, with little change in the remainder of the population. Alternatively, the entire BMI distribution may be shifted upward. As the results of our review are similar when the analyses are limited only to White children and adults, secular changes in the race/ethnicity composition of the U.S. population are an unlikely explanation for the secular increase in BMI-for-age and prevalence of overweight. For older children and particularly for adults, the entire distribution is shifted upward in 1988–1994 compared to 1976–1980 (Flegal & Troiano 2000). Thus our review suggests that few in the U.S. are immune to the environmental influences responsible for weight gain and accordingly interventions should be broad and population-based, rather than targeted at individuals.

Not all overweight children grow into overweight adults and not all overweight adults are overweight as children. However, based on a review of epidemiological literature published between 1970 and 1992, Serdula et al. (1993) estimated that about one-third (26 to 41%) of overweight (definitions varied between studies) preschool children and one-half (42 to 63%) of overweight school-age children became overweight as adults. Overall, the risk for becoming an overweight adult was 2- to 6.5-fold higher for overweight children than for their non-overweight peers. The greatest

risk of adult overweight occurred among children who were heavier and older; as many as three-quarters of overweight adolescents may be overweight as adults (Guo et al. 1994; Whitaker et al. 1997).

It is difficult to predict the magnitude of the adult consequences of the recent rises in overweight among children from the past tracking data. National data on U.S. adults shows that young adults tend to gain weight as they age, peaking in middle age and then declining during old age. Observed increases in adult obesity patterns are, at least in part, a consequence of the ever-increasing numbers of overweight adolescents entering adulthood. The degree and extent to which adults overweight from adolescence follow the pattern of the past, increasing their adiposity in middle age, is unknown. The possibility of this occurrence suggests a phenomenon heretofore not experienced: a new category of extreme obesity initiated in childhood and exacerbated in the fourth and fifth decades of life, with enormous ramifications for increased morbidity and mortality.

The causes of the observed increase in overweight prevalence are multi-factorial and complex, and have proven difficult to quantify (Ritchie et al. 2001). Energy imbalance and resultant gain of excessive weight can result from over-consumption of energy (i.e., excessive food intake), under-expenditure of energy (i.e., inadequate physical activity), or both. Recent dietary surveys indicate that energy consumption has risen in recent years among U.S. children (Nielsen et al. 2002). Further, low levels of physical activity are common (Harrell et al. 1997; Gordon-Larsen et al. 1999) and certain components of physical activity (e.g., participation in physical education classes) and fitness (e.g., endurance) appear to have declined in recent decades among American youth (Luepker 1999; Pratt et al. 1999).

Conclusion

The potential ramifications of the current prevalence of pediatric overweight on future adult obesity and morbidity are great cause for concern. The rising prevalence of pediatric overweight in the U.S. is likely a harbinger of future increases in diabetes, cardiovascular disease, metabolic syndrome, and other obesity related conditions. Furthermore, disparities in overweight among ethnic and socio-economic groups may further increase existing racial disparities in rates of chronic disease.

Because shifts in gene pools occur slowly, the likely cause of increasing pediatric overweight is a changing environment that favors weight gain. A recent World Health Organization report has concluded that an individual's normal self-adjustment in food intake to maintain energy balance is overwhelmed in our current world by environmental and behavioral factors (WHO 1998). Practitioners and educators must examine the complex interaction between high-risk groups and their environment. Sustainable policy and programmatic strategies to impact dietary intake and physical activity and prevent pediatric overweight are urgently needed.

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Zusammenfassung

Alarmierende Trends in der Verbreitung von Übergewicht im Kindesalter in den USA

Zielsetzung: Eine umfassende Prüfung der Literatur zu Übergewicht im Kindesalter wurde vorgenommen, um langfristige Veränderungen im Vorkommen, das gegenwärtige Ausmass und die Reichweite von Übergewicht im Kindesalter zu untersuchen und, um Gruppen mit besonders hohem Risiko in den USA zu identifizieren.

Methoden: Spezifisch berücksichtigt wurden Artikel, die während der letzten 20 Jahre publiziert wurden und Studien mit national repräsentativen Teilnehmerzahlen.

Ergebnisse: Eine noch nie da gewesene Verdoppelung der Prävalenz für Übergewicht im Kindesalter war in den letzten Jahrzehnten zu verzeichnen und die Datenlage deutet darauf hin, dass sich dieser Trend unvermindert fortsetzt. Keine sozio-ökonomische oder ethnische Untergruppe konnte sich diesem Trend entziehen. Afroamerikanische Mädchen und lateinamerikanische Mädchen und Knaben sowie Kinder aus Haushalten mit niedrigem Einkommen sind besonders gefährdet.

Schlussfolgerungen: Die steigende Prävalenz für Übergewicht im Kindesalter in den USA ist ein Vorbote für eine Zunahme von Diabetes, Herzkreislauferkrankungen und zahlreichen anderen Gesundheitsproblemen. Weiterhin ist zu erwarten, dass die ethnischen und sozio-ökonomischen Ungleichheiten bei Übergewicht im Kindesalter die bereits bestehenden Ungleichheiten im Vorkommen von Krankheiten noch verstärken. Es bedarf dringend Strategien und Programme zur Vorbeugung von Übergewicht bei Kindern.

Résumé

Tendance alarmante du surpoids pédiatrique aux Etats-Unis

Objectifs: Une revue exhaustive de la littérature sur le surpoids pédiatrique a été effectuée pour examiner les changements au cours du siècle de la prévalence du surpoids, son importance actuelle et son extension, ainsi que pour identifier les groupes à haut risque aux Etats-Unis.

Méthodes: Etude des articles publiés au cours des 20 dernières années et des études portant sur des échantillons d'enfants représentatifs au niveau national.

Résultats: Un doublement sans précédant de la prévalence du surpoids pédiatrique s'est produit au cours des récentes décennies aux Etats-Unis et les données suggèrent que cette tendance se poursuit inexorablement. Bien que cette tendance touche tous les groupes socio-démographiques et ethniques, les filles africaines-américaines, les garçons et les filles hispaniques et les enfants de familles ayant un bas revenu sont particulièrement à risque.

Conclusions: La prévalence croissante du surpoids pédiatrique aux Etats-Unis est une source d'accroissement du diabète, de maladies cardio-vasculaires et de nombreux autres problèmes de santé. De plus, les disparités de surpoids pédiatriques selon l'ethnie ou le niveau socio-économique ont probablement exacerbé les inégalités actuelles concernant les taux de maladies chroniques. Il est urgent de développer des stratégies et des programmes destinés à prévenir le surpoids chez les enfants.

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