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Obesity and insurance status among students in a Job Corps vocational education and training programme

Throughout adolescence, young people gain greater independence in many areas of their lives including increased responsibility for learning, employment and health behaviors. This transition is difficult for some young people, particularly those from disadvantaged backgrounds, who may not develop in the same way as those from advantaged backgrounds. Socio-economic status (SES) has a major impact on education and health and young people with low SES are less likely to graduate from high school and less than half has regular connections to school or employment (US, DOL, 1997). Health is also affected. For example, family income is inversely associated with obesity particularly in Whites (Freedman 2011; Kumanyakia, et al., 2008; O'Dea & Wilson 2006). Disadvantaged young have adversity that is difficult to overcome.

To assist low income young people, the US funds Job Corps (JC), a programme to educate low income young people (ages 16-24) to attain a high school diploma/General Education Development (GED) and vocational education. The programme is primarily residential to remove young people from less than optimal social environments and help them become educated, gain independence and skills toward productive adult lives. About 100,000 students are currently enrolled in 124 JC centres across six regions in the U.S. and must meet the poverty level published by the Department of Health and Human Services (HHS).

The purpose of this study was to determine the weight patterns of young people as they enter into the JC education programme. Additional aims were to determine if there were differences in overweight and obesity prevalence associated with age (computed into a new variable, adolescents (age 16-19) and adults (≥20) ethnicity, gender and health insurance status (insured or uninsured) as well as to provide demographic assessment of a JC centre population.

Methods

A retrospective longitudinal cross sectional study included data from all students entering into a JC education centre during a 16-month period. Variables included; age, race/ethnicity, gender and health insurance status. Also collected were height and weight measurements. The exclusion criteria for subjects included females who were pregnant upon entry since this can influence weight.

Design and procedures

This cross-sectional retrospective study was approved by the Institutional Review Board at the University of Massachusetts and the JC national office. All heights and weights were obtained on the same calibrated scale on the day of arrival. Body Mass Index (BMI) and percentile were calculated via the Centers for Disease Control (CDC) teen calculator for students ages 16-19 and adult calculator for those 20 and over. BMI categories were examined according to CDC standards: percentile age-specific BMI: ages 16-19 as underweight (≤5th percentile), normal weight (5th–84th percentile), overweight (85th–94th percentile), or obese (≥95th percentile) and by adult (age ≥20) as underweight (BMI≤18.5), normal (BMI=18.5-24.9), overweight (BMI=25.0-29.9), and obese (BMI≥30).

Data Analysis

Data were analyzed in SPSS 19 (IBM, 2010). Descriptive statistics (mean, standard deviations, and confidence intervals) for BMI stratified by four demographic variables, age (transformed to a new variable of adolescent: ages 16-19 and adult: ≥20 years of age), gender, and ethnicity and health insurance status were

Table 1. Population characteristics for Total Sample (N=186)

Gender (%)		
Male	51%	(n=95)
Female	49 %	(n=91)
Race/Ethnicity (%)		
White/non-Hispanic	52%	(n=96)
Black/non-Hispanic	23%	(n=42)
Hispanic/Latino	25%	(n=47)
Age (years)		
Median	20.5	
Mean (SD)	19.2 (1.9)	
Range	16-25	
Age (Adolescent/Adult %)		
Adolescent (16-19)	59%	(n=108)
Adult (≥20)	41%	(n=78)
Insurance (% uninsured)		
Adolescent	55%	(n=59)
Adult	79%	(n=61)
Total	65%	(n=120)
BMI Categories (adult standards %)		
Underweight	<4%	(n=8)
Normal	40%	(n=73)
Overweight	25%	(n=48)
Obese	31%	(n=57)
BMI (kg/m^2)		
Median	31.7	
Mean (SD)	27.5 (7.1)	
Range	14.6-48.9	

calculated. Weight percentiles were analyzed as underweight, normal, overweight, obese and combined overweight and obese. Q-Q plot*, histogram and K-S** statistic revealed asymmetric distribution of the sample and, as such, violated model assumptions. Although the data were squared and log transformed for analysis, this was not clinically useful or meaningful.

Therefore, non-parametric tests were chosen to determine if there were significant between group differences. Kruskal-Wallis tests were used to determine differences in BMI by ethnic groups and Mann-Whitney tests were used to analyze differences in gender and health insurance status in the adolescent and adult samples. Regardless, the analysis techniques revealed similar results and therefore were left in non-parametric format for reporting.

Table 2. Prevalence % from total population of *overweight* and *obese* youth by ethnicity and gender for the total sample

	Race/Ethnicity			
	White Non-Hispanic	Black Non-Hispanic	Hispanic Latino	Total Sample
Gender	Prevalence % (n)	Prevalence % (n)	Prevalence % (n)	Prevalence % (n)
Female (n= 91)	29% (n=26)	15% (n=14)	14% (n=13)	58% (n=53)
Male (n=95)	27% (n=26)	11% (n=10)	17% (n=16)	55% (n=52)
Total (N=186)	28% (n=52)	13% (n=24)	16% (n=29)	56%(n=105)

Results

The sample included 192 JC young people, ages 16-25. Although there were some Asian and Alaskan-Native American students in the population (n=6), these were omitted from the analysis because the sample size was too small to generalize, leaving 186 students for the final analysis. The majority, 65%, of the total population lacked health insurance and a disparate 79% of the adults (≥20 years of age) were uninsured compared to 55% of the adolescent population. The BMI range was between 14.6 kg/m^2 and 48.9 kg/m^2 with a median of 31.7 kg/m^2. The mean BMI was 27.5 kg/m^2, sd = 7.1. Population characteristics are described in Table 1 (above left).

Age, Gender & Ethnicity- Overweight and Obese Young People

Table 2 (above right) illustrates unhealthy weight patterns for combined overweight and obese young people in the total population (N=186) that reveals over half, 56% (n=105), of the entire sample was either overweight (25%, n=48) or obese (31%, n=57).

There was no difference in adolescent overweight and obesity prevalence between females and male subjects with an almost equal prevalence of overweight and obese young people with 58% (n=53) of females and 55% (n=52) of males being either overweight or obese. Racial/Ethnic differences were not statistically significant (p=.28) with 57% of blacks and 62% Hispanic/Latino compared to only 54% of whites being overweight and obese. Overall, both female and male whites had a lower incidence of being overweight or obese than Hispanic/Latino and blacks, although not enough to be statistically significant (p=.54).

Age, Gender & Ethnicity-Obese Only Young People

Approximately one-third (n=58, 31%) of the young people in this study were obese. Although not enough to be statistically significant (p=.35), overall the rate of obese females (36%, n=33) was 10 percent higher than males (26%, n=25). Ethnic differences were non-significant (p=.71); however, Black non-Hispanic overall had the highest percent of obese young people with 43% (n=18) compared to 29% (n=28) of whites and only 26% (n=12) of Hispanics being in the obese category. Overall, adolescents had a higher obesity rate of 34% (n=37) than adults 27% (n=21). Table 3 (next page) depicts the prevalence of obesity among different age, gender and ethnic groups and for the entire sample.

* Q-Q = quantile-quantile plot ** K-S = Kolmogorov-Smirnov test

Table 3. Prevalence & percent of *obese* youth among age, gender and ethnic groups for the total sample

		Race/Ethnicity			
		White Non-Hispanic	Black Non-Hispanic	Hispanic Latino	Total Sample
Gender	Age Group	Prevalence % (n)	Prevalence % (n)	Prevalence % (n)	Prevalence % (n)
Female (n= 91)	Adolescent (n=55)	34% (n=10)	38% (n=5)	38% (n=5)	36% (n=20)
	Adult (n=36)	37% (n=7)	62% (n=5)	13% (n=1)	36% (n=13)
Total Female	*(n= 91)*	*35% (n=17)*	*48% (n=10)*	*29% (n=6)*	*36% (n=33)*
Male (n=95)	Adolescent (n=53)	28% (n=7)	63% (n=5)	25% (n=5)	32% (n=17)
	Adult (n=42)	17% (n=4)	23% (n=3)	16% (n=1)	19% (n=8)
Total Male	*(n= 95)*	*23% (n=11)*	*39% (n=8)*	*23% (n=6)*	*26% (n=25)*
Overall	Adolescent (n=109)	31% (n=17)	48% (n=10)	30% (n=10)	34% (n=37)
	Adult (n=78)	26% (n=11)	38% (n=8)	14% (n=2)	27% (n=21)
Total (N=186)	*(N= 186)*	*29% (n=28)*	*43% (n=18)*	*26% (n=12)*	*31% (n=58)*

Insurance Status

For the total population, the majority, 65 % (n=120), was uninsured. Of the 108 adolescent students in the study, 45 % (n=49) were insured compared with only 21 % (n=17) of the adults in the study. A weak correlation was found (rho (184) = .243, $p < .01$). Adolescents were insured at a significantly higher rate (m place = 84.31) than adults (m place = 106.23, U= 3219.00, p = .001). The relationship between weight status and insurance was not significant (r (184) = -.0243, $p > .05$) indicating insurance is not related to weight status in this population. Similarly, although descriptive statistics revealed that 60 % (n=58) of white students, 74 % (n=31) of black students and 64 % (n=30) of Hispanic students were uninsured, there were no significant differences (p=.42) in insurance status between ethnic groups. There was a significantly (p=.001) higher mean BMI and higher standard deviation (27.55 kg/m^2, sd=7.02) in those without health insurance in contrast with those who were insured with a mean BMI (25.5 kg/m^2, sd=3.18), although both would be classified as overweight.

Discussion

The young people from this centre came from across the country; therefore, to understand how this population compares to the general population, national estimates were reviewed. About one-third of U.S. adults are obese and approximately 17% of children and adolescents are obese (Flegal, Carrol, Ogden and Curtin 2010; Kumanyika et al., 2008). For the adults in this population, there was a 27 % obesity rate, less than that of the US population. However, when reviewing the adolescent population, there was a 34% obesity rate, which is twice that of the general youth population in the US. These findings echo those found by Bodenlos and colleagues (2010), where half of the JC students (N=641) in their study were overweight or obese. These results, while disturbing, are not surprising, given the correlation between low SES and obesity.

There were weight-related disparities among the adolescent youth in this JC population, in particular Hispanic young people who were more likely to be overweight or obese than their White and African American counterparts. Although Whites had the lowest prevalence overall for being overweight and obese and the second highest for obesity, the rates were still striking. This is in line with national trends that show obesity rate typically increase as income and parental education decrease in white children, although different patterns have been found for children from ethnic minority groups (Freedman, 2011). This finding elucidates the importance of including low-income whites in health disparity population research and practice.

U.S. estimates reveal that as many as one in five African Americans and one in three Hispanic individuals, compared with one in

eight whites, lack health insurance (Mead et al., 2008). In this study, these were even higher than US estimates with three in four African Americans, three in five Hispanics and three in five white individuals having no health insurance. Similarly, there were major age related differences in insurance rates, especially between adolescents and adults. However, there were a significantly higher number of uninsured adults versus adolescents (79% vs. 55% respectively) and suggest a relationship between health insurance and age. In spite of this, there was a higher percentage of obese adolescents over adults (68% vs. 55%), although more adolescents were insured. The lack of care and individual clinician health education contributes significantly to health disparities. This period presents an important opportunity to prevent the health problems associated with being obese before they develop or while they are reversible. Study findings spanning over one and a half decades suggest that being overweight during adolescence predicts a broad range of adverse health effects that are independent of adult weight trends (Kumanyaki et al., 2008). Alterations in health associated with obesity are difficult to improve without health insurance.

Young people enrolled in JC have educational goals that culminate in securing gainful employment. This may be problematic in those who are obese as national data (France) revealed that the percentage of time spent unemployed during working years is significantly higher for each kg/m^2 deviation from the mean body mass index (BMI) (Paraponaris, Saliba, Ventelou, 2005). Other studies examining the relationship between employability and obesity found discrimination among employers across all job selection criteria, such as starting salary, leadership potential, and likelihood of selecting an obese candidate for the job in those who are obese (O'Brien, Latner, Egneter & Hunter, 2012).

Learning Environment

The US Department of Health and Human Services (DHHS) task force found characteristics of the social and physical environments shape human experience and offer opportunities for health (Anderson et al., 2003). The time in which young people are enrolled in a vocational programme is a major transitional period and, as such, an ideal time in which the culture of school life can be optimally aimed at shaping health behaviors aimed at achieving wellness. This is an opportune time to educate them about healthy lifestyles and health-focused life skills (e.g. meal preparation and understanding basic nutrition). Since health promotion efforts implemented on a student community and cultural level may have a greater impact on behavior change than those with an individual focus, the environment should shape a culture of wellness and community support for health (Kumanyika et al., 2008).

Prior research conducted on JC education training students showed that students may not perceive their weight and associated health risks as problematic (Bodenlos et al., 2009). Since many JC students have not graduated from high school or have not attended school consistently, vocational education is a major portion of their secondary education and should include health education. The majority of this population is of unhealthy weight and education needs to occur on both a micro (individual) and macro (population) level to educate students about the need for maintaining a healthy weight. Further, curriculums should include health education that extends beyond occupational health and safety and includes work readiness thought employee wellness.

Limitations

The author recognizes the bias of limited representation associated with the geographically-limited convenience sample used in this study. The results may not be representative of the general JC population, all vocational training students or all young people living with low SES and thus limits the external validity of the findings.

Conclusion

The intent of this study was to understand the weight patterns of young people as they enter into a JC centre. Since a significant economic and social investment is being made in all students engaged in career vocational education, not only those enrolled in JC and in the US, curriculum should focus on a holistic approach that includes healthy lifestyles and education for these young people. Further research aimed at understanding the connection between student employability and weight patterns should be explored. These are young people who offer valuable service to society

with their vocations and have the potential for a promising future.

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Bibliography

Anderson, L.M., Scrimshaw, S.C., Fullilove, M.T. & Fielding, J.E. (2003). Task Force on Community Preventive Services. The Community Guide's Model for Linking the Social Environment to Health. *American Journal of Preventive Medicine*. 24(3S): 12-20.

Bodenlos, J.S., Rosal, M.C., Blake, Diane. D., Lemay, C. & Elfenbein, D. (2009). Obesity Prevalence, Weight-Related Beliefs and Behaviors among Low-Income Ethnically Diverse National Job Corps Students. *Journal of Health Disparities Research Practice.* 3(3) Retrieved April 5, 2014 from: http://digitalscholarship.unlv.edu/cgi/viewcontent.cgi?article=1046&context=jhdrp

Flegal, K.M., Carrol, M.D., Ogden, C.L. & Curtin, L. (2010). Prevalence and trends in obesity among US adults,1999-2008. *Journal of the American Medical Association.* 303(3): 235-41.

Freedman, S. (2011). Obesity - United States, 1988-2008. *Morbidity Mortality Weekly Report Supplement.* 11(60): 73-77.

Kimmel, D. & Weiner, I. (1995). *Adolescence, A developmental transition (2nd ed)*, New York, Wiley & Sons, Inc.

Kumanyika, S.K., Obarzanek, E., Stettler, N., Bell, R., Field, A.E., Fortmann, S.P., Franklin, B.A., Gillman, M.W., Lewis, C.E., Poston, W.C., Stevens, J. & Hong, Y. (2008). American Heart Association (AHA) Scientific Statement. "Population-Based Prevention of Obesity". *Circulation.* 18: 428-464.

Mead, H., Cartwright-Smith, L., Jones, K., Ramos, L.J., Woods, K. & Siegel, B. (2008). *Racial and Ethnic Disparities in U.S. Healthcare: A Chartbook.* The Commonwealth Fund. Retrieved April 5, 2014 from: http://www.commonwealthfund.org/usr_doc/mead_racialethnicdisparities_chartbook_1111.pdf

O'Dea, J.A. & Wilson, R. (2006). Socio-cognitive and nutritional factors associated with body mass index in children and adolescents: Possibilities for childhood obesity prevention. *Health Education Resource*. 21(6) 796-805.

O'Brien, K., Latner, J., Ebneter, D. & Hunter, J. (2013). Obesity discrimination: the role of physical appearance, personal ideology, and anti-fat prejudice. *International Journal of Obesity*. 37, 455-460.

Paraponaris, A., Saliba, B. & Ventelou, B. (2012). Obestiy, weight status and employability : empirical evidence from a French national survey. *Economics & Human Biology*. 3(2): 241-258.

United States Department of Labor Statistics. (1997). *Bureau of Labor Statistics. National Longitudinal Survey of Youth. 1997.* (USDL Pub. No. 99-110) Retrieved April 5, 2014 from: http://www.bls.gov/opub/mlr/2001/08/art2full.pdf